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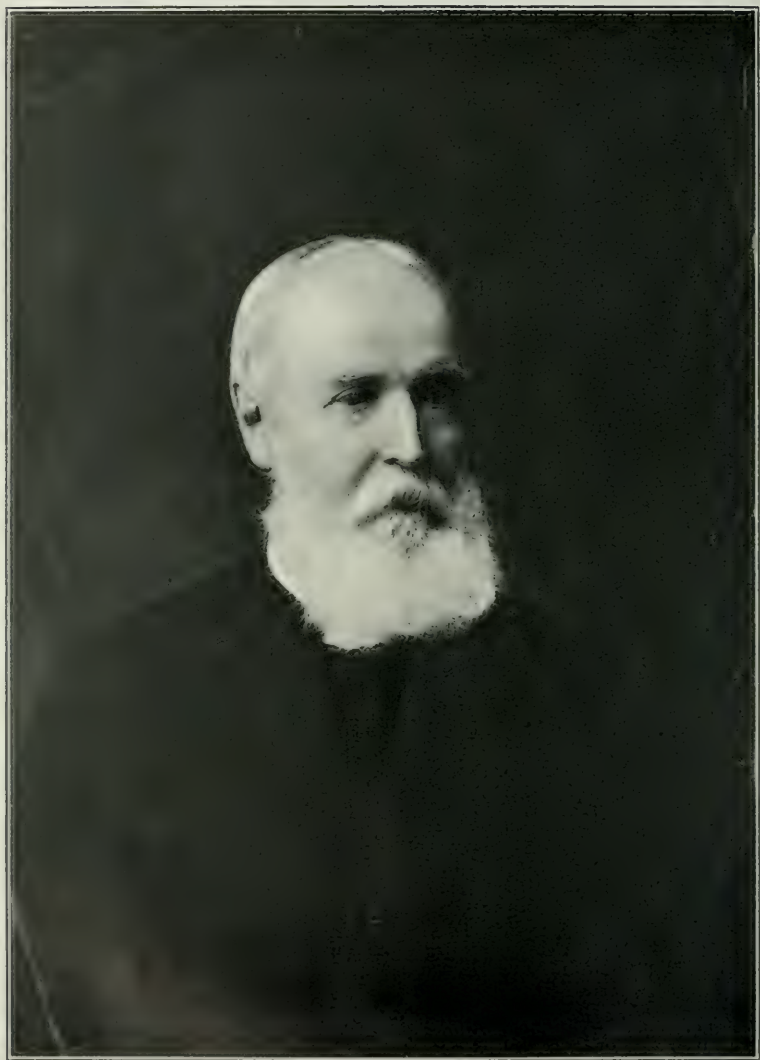
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THE REV. CHARLES J. S. BETHUNE.

The Canadian Entomologist.

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No. 1.

VALEDICTORY.

More than forty years ago, in August, 1868, the Editor put forth the first number of the CANADIAN ENTOMOLOGIST, a modest venture of eight pages. The same Editor last month brought to completion the 41st volume of this periodical. He has not, however, been continuously carrying on this work during all those years. After the publication of the first five volumes he was succeeded by his friend, Dr. William Saunders, of London, who edited the magazine for the next thirteen years. In 1886 Dr. Saunders was appointed Director of the Experimental Farms of the Dominion, and found his time so fully employed that he requested Dr. Bethune to take his place and become Editor once more. Thirteen of the forty-one volumes have thus been edited by Dr. Saunders, and twenty-eight by Dr. Bethune.

It is now necessary to make a change and transfer the charge of the magazine to younger hands. The weight of advancing years and the disability occasioned by impaired eyesight have led the long-time Editor to ask for relief, and to shift the burden of responsibility to other shoulders. It is with much reluctance that he gives up this labour of love and ceases to correspond with his widely-scattered contributors, to whose kindness and ability the success of the magazine has been so largely due. To say good-bye to old friends is a painful duty, and to give up work because one has become too old for its proper accomplishment is perhaps more painful still. But time is inexorable; there is no escape from the changes it brings, and so it becomes a paramount necessity to make way for the younger men, to pass on into their vigorous hands the torch of science which one can no longer hold on high.

Happily a worthy successor is available, and the announcement is made with much gratification that Dr. E. M. Walker, Lecturer in Biology at the University of Toronto, has accepted the position of Editor of the CANADIAN ENTOMOLOGIST. Dr. Walker's name is widely known in scientific circles through the admirable work that he has accomplished in the Orthoptera and Odonata, to which orders he has especially directed his attention. It is earnestly hoped that the many friends of the Editor who now retires will be as considerate, as kind, and as generous to the

new incumbent of the office as they have so long been in the past. Long may the CANADIAN ENTOMOLOGIST continue to flourish, and long may Dr. Walker be enabled to preside over its destinies.

All communications for the CANADIAN ENTOMOLOGIST, books for review, etc., should be addressed to the Editor,

DR. E. M. WALKER,
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University of Toronto, Toronto.

All business matters connected with the Society or the magazine, such as advertisements, subscriptions, etc., should continue to be addressed to the

Entomological Society of Ontario,
Guelph, Canada.

THE REV. CHARLES JAMES STEWART BETHUNE, M.A.,
D.C.L., F.R.S.C.

The many readers of the CANADIAN ENTOMOLOGIST will be glad to again see a portrait of the talented editor, who has with such conspicuous ability filled the editorial chair for so many years, but will greatly regret to learn that through failing eyesight he has found it necessary to retire from the editorship, and will be succeeded by Dr. E. M. Walker, of Toronto, the Vice-President of the Society.

Dr. Bethune was the third son of the Right-Reverend Dr. A. N. Bethune, the second Anglican Bishop of Toronto, and was born at West Flamboro', Ont., Aug. 11, 1838, and is, therefore, in his 72nd year. He was educated first at private schools, and afterwards at Upper Canada College, where he was head boy in 1856. He matriculated at Trinity College, Toronto, in the same year, winning the First Divinity scholarship, and the Wellington scholarship in 1857, and graduating in 1859 with first-class honours in classics, as well as standing high in mathematics and winning the Jubilee scholarship. He was ordained deacon in 1861 by the late Bishop Strachan, and advanced to the priesthood in 1862, and became curate of St. Peter's, Cobourg, and afterwards of Carlton, Selby, Yorkshire. Returning to Canada, he was appointed incumbent of the Credit Mission, which he held from 1866-70, and was then appointed to the head mastership of Trinity College School at Port Hope, Ont., which position he held up to the summer of 1899, when he resigned and moved to London, Ont. In 1906 he accepted the appointment of Professor of Entomology and Zoology at the Ontario Agricultural College at Guelph.

Dr. Bethune early identified himself with the Entomological Society of Canada, as it was at first called, which had been organized in April, 1863, under the presidency of Prof. Croft, of Toronto, with Mr. William Saunders, of London, as Secretary-Treasurer.

In 1868 the Society began the issue of the CANADIAN ENTOMOLOGIST, the first number being dated August 1st, and was edited by Dr. Bethune, who at that time held the position of Secretary-Treasurer of the Society.

Of the 41 volumes which have been issued, Dr. Bethune edited all but thirteen, viz.: From the beginning up to the 9th number of Vol. V, and from the 10th number of Vol. XVIII to the present time.

Of the high standard at which he maintained the magazine it is not necessary to speak, as it has been universally acknowledged, but emphasis may be laid on the fact that with the exception of the few years in which he was living in London, the work had to be done in the intervals of an extremely busy life, as the Head Master of a large public school, which laid a heavy load of responsibility upon his shoulders, and more lately as Professor in a great agricultural college. In addition to editing the CANADIAN ENTOMOLOGIST, he edited for a considerable period the entomological department of the Canadian Farmer and the Weekly Globe, as well as the Annual Reports of the Entomological Society.

In 1883 he received the degree of D.C.L. from his alma mater, and in 1892 was elected a Fellow of the Royal Society of Canada.

To those who enjoy the privilege of knowing him, it is unnecessary to speak of his charming personality, his refined and cultivated mind and the great courtesy which have won him the warm regard and, indeed, affection of his host of friends. The positions which he has held in the Church, in the educational and scientific worlds have been many, and he has filled them all with distinguished ability. Though he has passed the three score years and ten, his lithe and upright carriage give the appearance of a much younger man, and all his friends will unite in hoping that the relief from editorial duties will be of great benefit to him, and that he may be spared for many years yet to his family and friends, and to the Entomological Society, which owes him so much.

H. H. L.

All readers of the CANADIAN ENTOMOLOGIST will note with pleasure that the Rev. Charles J. S. Bethune, who has found it necessary to retire from active editorial work, has been appointed Editor Emeritus of that journal by the Executive of the Entomological Society of Ontario.

NEW SILPHIDÆ OF THE TRIBE ANISOTOMINI.

BY H. C. FALL, PASADENA, CALIF.

There has recently come to hand from Mr. W. S. Blatchley, of Indianapolis, a small Silphide, which he recognized as new and which he desires that I should describe in order that it may be included in its proper place in his forthcoming descriptive catalogue of the Coleoptera of Indiana. The insect has much the appearance of an *Anisotoma*, and was so taken to be by both Mr. Blatchley and myself until more closely examined. It proves to be rather closely related to *Liodes*, but the difference in form, general facies, and certain structural characters, seem to require that it be made the type of a new genus, which is briefly characterized below. Opportunity is taken to describe at this time several new species of *Anisotoma* in my own collection.

STETHOLIODES, new genus.

Form oblong-elliptical, subdepressed; elytra with nine regular punctured striæ, the outer one distant from the margin. Labrum arcuate in front, with a small, shallow median emargination. Clypeus with narrow membranous border, the frontal suture completely lacking, the lateral frontal impressions feebly indicated. Prosternum as long before the coxæ as the thickness of the latter from front to back; mesosternum strongly oblique; other characters nearly as in *Liodes*.

Stetholiodes laticollis, n. sp.—Oblong-elliptical, subdepressed, rufo-testaceous, shining. Antennæ reaching the hind angles of the prothorax: third joint as long as the three following, fourth slightly longer than wide, sixth a little transverse, seventh larger, eighth similar to the sixth, but a little shorter, ninth to eleventh much larger, the eleventh longer than wide, and nearly as long as the two preceding together. Eyes small, feebly convex. Head half as wide as the prothorax, sparsely, evenly punctulate. Prothorax about twice as wide as long, a little wider than the elytra, sides broadly arcuate and gradually narrowed from the base; base angles subrectangular with rounded vertices; surface very minutely alutaceous and sparsely punctulate. Elytra more than twice as long as the prothorax, nearly one-fourth longer than wide, with nine striæ of punctures, the sutural stria impressed in apical half; stria punctures separated by their own diameters or a little less; intervals nearly flat and sparsely, irregularly punctulate, the sutural interval not narrower. Metasternum and abdomen alutaceous, the former distinctly punctate, except posteriorly, the latter more sparsely punctate. Length, 2.7 mm.; width, 1.6 mm.

Male.—Tarsal joints 5-5-4; front and middle tarsi dilated; middle and hind femora with a small denticle on the lower edge one-third from the knee; metasternum with a short tuft of hairs arising from a small subbasal fovea.

Indiana (Steuben Co.), May 25, 1909.

Anisotoma opacipennis, n. sp.—Moderately stout and convex, rufo-testaceous. Head and prothorax shining, finely punctate. Elytra finely alutaceous and opaque, finely punctate striate, the ninth stria marginal, except for a short distance at base; alternate intervals with a single series of distant punctures, the intervals otherwise impunctate. Head finely alutaceous, but somewhat shining, rather closely punctate, a transverse series of four or five larger punctures. Antennæ shorter than the prothorax, third joint less than twice as long as wide and barely as long as the next two; joints 4-6 short, 6 strongly transverse, 8 lenticular, 9-10 large, subequal, 11 smaller, transverse, pointed. Prothorax strongly rounded and widest at middle, sides strongly convergent, nearly straight and a little sinuate in front, broadly arcuate and convergent behind; hind angles obtuse, ill-defined; lateral margin sparsely fimbriate; surface sparsely, finely punctate, a little more closely at sides, and with a series of larger punctures around the base angles. Elytra wider than the thorax, sides nearly straight and parallel in basal half; epipleuræ sparsely punctate and with bristling hairs. Mesosternum oblique, carinate; metasternum and abdomen alutaceous, but moderately shining, distinctly punctate. Front tibiæ flattened externally, subtriangular; hind tibiæ rather strongly thickened apically; hind femora very stout, suboval, less than twice as long as wide; front and middle tarsi long and slender, nearly as long as the tibiæ. Length, 4.2-4.4 mm.

Described from two female specimens taken by the writer at El Paso, Texas.

The large size; form of prothorax, opaque elytra, fimbriate margins of the body, very stout hind thighs and long tarsi mark this a very distinct species, totally different from anything else in our fauna. Another feature peculiar to this species exists in the very long spurs of the front tibiæ, these being very slender, parallel and about one-third as long as the tibia. In all other species of the genus known to me the spurs are short, stouter, and gradually pointed.

Anisotoma similis, n. sp.—Very similar to *collaris*, the description of which in Horn's Monograph of the Silphidæ (Trans. Am. Ent. Soc., VIII,

p. 289), fits so accurately that it is necessary only to mention the distinguishing character. In *collaris* the prothorax is wider at middle than at base, the sides being rounded-in basally. In *similis* the thorax is widest at the extreme base, the hind angles rather sharply defined and a little obtuse. The punctures of the elytral interspaces are very fine, except the coarser ones on the alternate intervals. Sexual characters as in *collaris*. Length, 3-3.3 mm.

Santa Monica, California. A single pair in the writer's collection.

Anisotoma antennata, n. sp.—Elongate oval, moderately convex, rufo- or flavotestaceous, shining. Head and prothorax minutely, sparsely punctate. Elytra regularly punctate striate, the striae not impressed, the ninth stria marginal except at base; elytral interspaces minutely, very sparsely punctate, alternate ones with moderately distant coarse punctures. Antennae nearly as long as the head and thorax, third joint as long as the next two, joints 4-6 each as long as or a little longer than wide, 7 obtrapezoidal, about as long as wide, 8 small, twice as wide as long, 11 as wide as 10 and nearly as long as 9-10 united, apex obliquely truncate. Prothorax one-half wider than long, narrowed from the extreme base, the sides becoming basally almost parallel; hind angles distinct and nearly rectangular. The head shows the usual transverse frontal series of coarser punctures, and there is a line of coarser punctures along the basal margin, these becoming closer and less regularly serial at the angles. Elytra twice as long as the prothorax and about one-third longer than wide, sides parallel in basal half. Metasternum and abdomen alutaceous, sparsely punctate, the abdomen more finely so. Length, 2.5-2.9 mm.; width, 1.3-1.5 mm.

Pasadena, California.

The only two examples known to me are females; they have the hind femora gradually broader outwardly, the condyle a little prominent, but not at all dentiform; tibiae straight. The form is more elongate than in any of our other species except *ecarinata*. There is a series of minute punctures along the extreme edge of the basal margin of the prothorax, not noticed by me in any other species. The form of the last antennal joint is peculiar to this species, and its mass is relatively greater than in any other known to me, being nearly equal to that of the two preceding joints combined.

Anisotoma sculpturata, n. sp.—Oblong oval, moderately convex, rufotestaceous. Head and prothorax shining, the former rather closely,

the latter more finely and sparsely punctate, especially at the middle. Elytra densely longitudinally reticulato-aciculate, finely striate, the striae punctures fine and much obscured by the sculpture of the interspaces. Antennæ short, the club very broad, and constituting rather more than half the length; eighth joint very thin, lenticular, the third joint as long as the next two together. Clypeal suture completely obliterated. Prothorax rather strongly rounded at sides, widest behind the middle, hind angles defined, but very obtuse. Mesosternum nearly vertical between the coxæ, carinate. Metasternum coarsely punctate. Legs short, the femora stout. Length, 2.3 mm.

Flagstaff, Arizona. A single female collected by Dr. Fenyes.

The sculpture of the elytra will, if constant, at once distinguish this from any other species in our fauna. It is, however, very nearly identical structurally with *obsoleta*, and is possibly only a remarkable aberration of that species. The sides of the prothorax are a little more rounded basally, the hind angles more obtuse and the punctuation of both head and pronotum a little more pronounced than in *obsoleta*.

As remarked by Horn, the subvertical mesosternum of *obliterata* and non-carinate mesosternum of *ecarinata* mark these species as aberrant members of the genus. Horn, however, apparently did not notice that these two species differ furthermore from all others of our fauna in the total obliteration of the clypeal suture. *Obliterata* and *sculpturata*, in addition to the subvertical mesosternum, have the outer edge of the front tibiae laminate to a degree not approached by any other of our species.

CYRTUSA.

The following very distinct species, most nearly related to *blandissima*, may best be made known by the subjoined diagnoses:

C. blandissima, Zimm.—Elytra striæ not impressed, the intervals flat, the ninth (marginal) much wider than the eighth; metasternum coarsely punctate at sides; abdominal segments each with a row of coarse, deep, closely-placed punctures along the basal margin: basal three joints of antennæ subequal in length, but gradually diminishing in thickness, the third about as long as the next two. Length, 1.5–2 mm.

C. superans, n. sp.—Elytral striæ more closely punctured, finely impressed, more evidently so at sides and apex, where the intervals are in consequence a little convex; eighth and ninth intervals subequal in width; metasternum less closely and more finely punctate; abdominal segments finely, somewhat irregularly punctate: basal three joints of

antennæ rapidly diminishing both in length and thickness, the third distinctly shorter than the next two. Length, 2.1 mm.

The elytral interspaces are very finely and sparsely punctulate or nearly smooth in *blandissima*; more evidently punctate in *superans*. According to Horn, the middle tibia of the male is "normal" in *blandissima*; in *superans* the tibia is thickened and arcuately produced internally at apex.

Superans is known only by the unique male type, taken at Tyngsboro, Mass., by Mr. Blanchard.

ON SOME PREOCCUPIED GENERIC NAMES IN INSECTS.

BY G. W. KIRKALDY, HONOLULU, HAWAIIAN ISLANDS.

While keeping up to date and partially revising my "Scudder" and "Waterhouse," I have from time to time noted several preoccupied generic names, which, so far as I have been able to find out, have no synonymy whereby the older name could be replaced without fresh creation. As letters to specialists have usually resulted in no action being taken in the matter, I now rename a number of them, in the hope that natural indignation at such an unlawful trespass on my part may induce specialists to purge their own lists. A further number I have left untouched, as I am unable to ascertain their possible synonymy.

Lepidoptera.

Feredayia, = || *Erana*, Walker.

Maorides, = || *Exoria*, Meyrick.

Americides, = || *Dryope*, Chambers.

Pempeltias, = || *Peltophora*, Meyrick.

Porina, Walker, is preoccupied, but is probably replaceable by other Walkerian names.

Diptera.

Neotropicalias, = || *Cyclogaster*, Macquart.

Colcoptera.

Sharpides, = || *Sharpia*, Broun.

Neosptychias, = || *Ptychopterus*, Broun.

Hemiptera.

Philapodemus, = || *Hahnina*, Ellenrieder.

Varelia, = || *Munia*, Varela.

HABITS OF SOME MANITOBA TIGER BEETLES
(CICINDELIDÆ). No. 2.

BY NORMAN CRIDDLE, TREESBANK, MANITOBA.

My last paper* dealt chiefly with these insects in the adult, or beetle state. In the present more attention is paid to their habits while in the earlier stages. My investigations have been conducted entirely in the field, under absolutely natural conditions, and unless otherwise stated, were made in the neighbourhood of Aweme, Manitoba.

Two valuable papers on Cicindelian habits have been added to my literature upon this subject, through the kindness of Prof. Shelford, of Chicago University, since the first of these articles appeared. The latter, "Life Histories and Larval Habits of the Tiger Beetles (Cicindelidæ),"† contains much interesting information upon the earlier stages of these insects, some of which must unavoidably be duplicated here. It will be noticed, however, that there is a striking difference in the life-cycle of some of the species observed by Prof. Shelford at Chicago and those noted by me at Aweme, even when the same, or a closely related form, is involved, the difference being a prolongation of the larval life over a second winter in Manitoba. This seemed to me to be such a remarkable fact, considering that there are less than 600 miles of latitude between the two places, that I felt almost persuaded that some mistake had been made on my part, and consequently decided to make further observations before publishing these notes. The result has been to leave no doubt that the life-cycle of species carefully observed—*C. Manitoba*, *venusta*, *limbata*, *limbalis*, and probably others—lasts for approximately three years; duration of larval stage, 24 to 26 months; pupal, two to four weeks; adult, 10 to 12 months. This corresponds to F. Enock's account of the "Life History of *Cicindela campestris*,"‡ excepting that the adults nearly if not always appear in August or September, constant observation having failed so far to detect overwintering pupæ. There is, however, considerable difference in the dates at which the beetles appear, the period of emergence in *C. Manitoba* and *venusta* often lasting over a month, and some of the former appear so late in the season that there is a possibility of a few remaining in the pupal cavity until the following spring, though the

*CAN. ENT., Vol. XXXIX, April, 1907.

†Linnean Society's Journal-Zoology, Vol. XXX, Mar., 1908.

‡Proc. Ent. Soc., London, 1903.

depth at which adults usually hibernate would seem to indicate that they might suffer from frost in the pupal chamber so near to the surface.

In Manitoba there are often long intervals of inactivity during the summer months of the larvæ of *Manitoba*, *venusta*, *limbata*, *Lecontei*, and probably others. At such times the larvæ close their burrows at the top, and remain apparently without food, and do not grow appreciably. In 1907, larvæ of *venusta* and *limbata* closed their holes on June 12, and some did not appear again until August 25, nearly two and a half months. A few, however, would open up at night, throw out a lot of earth, and then retire again. These larvæ were always active when dug out. This strange habit may be due to the dryness of the soil to some extent, though it is not altogether so, as holes have remained closed during wet weather, and they are always opened in autumn or late summer, and deepened before winter, no matter what the condition of the ground is. The extreme heat of the sun may also be a factor of some importance. The beetles are unquestionably influenced by temperature, and will go into winter quarters earlier on a dry, hot fall than they do during a cold one, and hot summer days are much preferred for commencing winter homes.

C. formosa Manitoba, Leng. — The larval burrow (Fig. 1) of this variety differs from all the other species dealt with here, and closely, if not

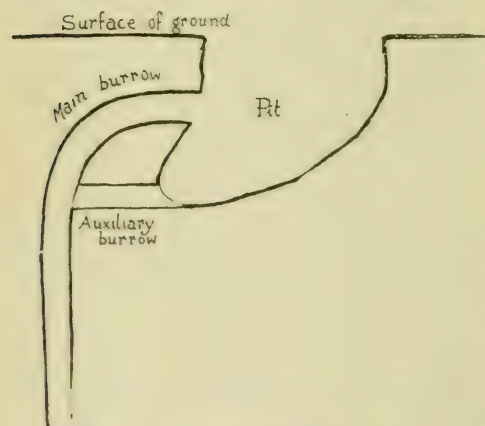


FIG. 1.—Burrow of *Cicindela Manitoba*.

exactly, resembles that of *generosa*, as described by Shelford. The burrow does not run in a straight line, as in other kinds, but when about one and a half to two inches from the surface gradually bends over so that the entrance enters a cup-like excavation about a quarter of an inch from the top, and at right angles to the perpendicular part of the hole. The pit or cup-like excavation varies in size according to the age

of the larva, and also to some extent in individuals of the same age, but in mature specimens is on an average one and a half inches wide, an inch

across from the entrance, and about the same in depth, with a downward slant towards the burrow. Larvæ dug out and watched, dug new holes in the following manner: The burrow was begun much on the slant, and dug back for some two inches, gradually turning downwards until a perpendicular position was arrived at. In excavating the pit the larva reached out and threw the earth backward, and in doing so gradually worked the burrow back until it became about a quarter of an inch from the surface. This made approximately the correct length of the pit. The larva now turned its attention to deepening the pit. This was accomplished in the individual watched by constructing an auxiliary hole from the perpendicular one horizontally into the bottom of the pit. The earth was then worked up from below, and shoved round the chief entrance until it became blocked, when the insect returned and threw the earth backwards from the main burrow. This operation was repeated a number of times, until the pit became nearly full depth, but its completion was not observed owing to the larvæ devoting its energies to the chief burrow for several days. The pits usually become partly or wholly filled up when the larvæ deepen their burrows before hibernating, and therefore have to be cleaned out again in the spring, but whether this is done by means of an auxiliary hole or not is doubtful. Some burrows examined showed signs that such was the case, others left no indication. The larvæ are very active, both in and out of their holes.

There is no doubt that the pits act chiefly as traps for insects such as ants, which are captured while endeavouring to make their way out. Experiments of throwing small ants in resulted in their immediate capture as soon as they reached the bottom, with such rapidity that it was difficult to see how they were seized, though the larva had to reach out fully half its length to secure them. Small bugs, when touched, which was seldom, were at once rejected.

The pits also act as a protection against drifting sand and heavy rains, but this is probably accidental, as the burrows are seldom in very open places, and are often where the sand never drifts.

Twenty larval holes of the second year were measured when the insects had finished digging. These showed an average depth of 66 inches, the shallowest being 50 inches, and the deepest 79 inches. Four others were over 70 inches below the surface.

The larval stage of *Manitoba* lasts approximately 24 months, and the adult about 12. The pupa has not been observed.

All remarks about larvæ under *Manitoba* in my first paper should be referred to *venusta*. Fuller observations have shown that owing to the great depth at which it hibernates, *Manitoba* is the last tiger beetle to appear in the spring. In 1908 adults remained in winter quarters until the end of May, and larvæ still later.

Venusta, Lec.—Young larvæ appear about the first of July, and at once proceed to deepen their burrows to a foot or more in the course of a couple of weeks. They then remain active, excepting while moulting, until the middle of October, during which period they grow very rapidly, and at the approach of winter deepen their burrows considerably, and after closing them remain dormant at the bottom throughout the winter. They then appear again in May, close their holes in June, and usually remain inactive until August, the burrows are then opened up and deepened to the extent of a few inches, closed in October for a second winter, and reopened the following spring. About the middle of June the larvæ construct a side chamber, starting from half an inch below the surface and branching off from the original burrow. The chamber varies in length, but averages three inches, and is generally about the same in depth at its extremity, where it is widened out into a chamber, about twice the width of the entrance. In this the larva changes to a pupa facing the top. Holes were observed closed on June 22, and by July 10 two larvæ had become shortened, evidently changing to pupæ. The first pupa was discovered July 15. This was situated about the middle of the pupal cavity, not in the largest part. On August 10 two imagoes were found still in the pupal cell. Both ran actively when dug out, and one made several short flights. On August 19 a large number of pupal chambers were examined, and only three adults found, all of which had partly dug out. By the 20th of August several beetles were digging winter quarters, and by September 1st most of them had disappeared below the ground.

The life of the adult is slightly shorter than *Manitoba*, but old individuals have been found in September. Larvæ show no signs of constructing pits, the holes being perpendicular throughout their entire length. Of a large number of second-year larval holes measured at the approach of winter, the average depth was 45 inches, the shallowest 32, and deepest 55 inches. Young larvæ were usually several inches shallower.

Limbata, Say.—The larvæ of this species appear from eggs at about the same date as *venusta*, and like that species are often at first found

clustered together, so that a dozen may be discovered in an area of a foot square. They usually inhabit situations where the sand is constantly drifting, which on account of its continual movement and lack of vegetation is always moist a few inches below the surface. The life-cycle is approximately the same as *venusta*. On July 22, 1907, larvæ had filled up old burrows with earth from the pupal cavity. This latter was commenced three inches below the ground, and was five inches in length, gradually sinking at its extremity to five inches below the surface. (Fig. 2.) Larvæ at this time were still quite active, and at once commenced to dig new holes when disturbed. Two pupæ were found on August 11, one only just changed from larva, and also an adult still in the pupal chamber. Most of the beetles were out by the 20th, though odd individuals appeared as late as the first of September. The larvæ remain active in the pupal chamber for fully two weeks, and occasionally longer.

Purpurea limbata, Klg. — Larvæ are usually found in damp situations, not more than six feet from surface water. Old pocket gopher hills and damp fields, where there are open spots, seem to be preferred. Pupal chambers are constructed some weeks before transformation takes place. The few examined opened at or near the surface of the ground, and varied from three to five inches in length. Two remained open for several days.

In summer larval holes are seldom more than six inches in depth, and their average, when closed in the fall, from the few measured, seems to be about eight inches. Twenty-four adults dug out in wet, sandy soil were found at an average depth of six inches, with little variation, and the burrows were open nearly the entire length.

The larval life lasts approximately two years, and the beetles from nine to eleven months.

Tranquebarica, Hbst.—Little new information has been secured regarding this species. Larvæ still digging were found on September 21st at an average depth of 17 inches, the deepest being 20 inches. Two holes

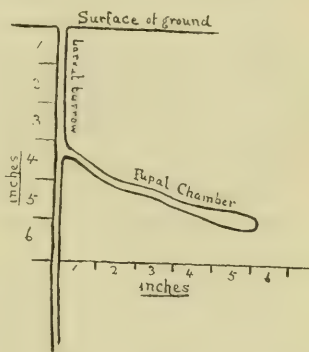


FIG. 2.—Pupal burrow of *Cicindela limbata*.

measured, when full depth, were only 18 inches in length. All were slightly on the slant from a level surface.

Two distinct sizes are to be found among the larvæ in autumn, which correspond to the first and second year of *venusta*, so that it seems highly probable that the larval life lasts two years, while that of the adult continues for about 11 months.

Fulgida, Say.—An interesting form of this species, with rather variable markings, has been collected by Mr. J. B. Wallis at Westbourne, Man., who says of it: "I took *fulgida* on what is known at Westbourne as the Salt Plain, an alkaline stretch of some extent. The plain is in the main fairly well covered with a loosely-growing wiry grass, with fairly numerous bare or nearly bare patches of soil not sufficiently alkaline to be more than gray. Here *fulgida* was plentiful in company with *tranquebarica*. The species is of strong flight, readily passing from one bare spot to another."

The above mentioned specimens were taken during the middle of August, and the species will probably be found to hibernate not at any great depth.

Scutellaris Lecontei, Hald.—Larvæ are found in similar situations to the beetles. A pupa was discovered on August 10 at a depth of five inches, and one inch from the larval burrow. On the 11th four adults were dug out, one of which had very recently arrived at maturity, and another had worked its way to within half an inch of the surface. The pupal chambers were from one to two inches in depth, where they branched off from the main burrow, and from two to three inches in length, dropping an inch in two and a half. Five larval holes at the approach of winter averaged 28 inches in length. The beetles have been found in fair numbers, especially when hibernating. They select denser vegetation than most of the other kinds, and prefer the south edge of bushes which border old fields. They pass the winter at 10 to 26 inches below the surface of the earth.

Pusilla, Say.—No larvæ have been found in Manitoba, but two new localities for the beetles were discovered, one specimen being taken by Mr. Wallis at Westbourne among the grass, and three by Stuart Criddle near the mouth of the Souris River, on a gravelly shore. These insects made no attempt to fly, but seemed to rely entirely upon their power of running and hiding to escape capture.

Pusilla terricola, Say.—Mr. Wallis has also added this variety to the Provincial list, having taken several specimens at Westbourne. He says of it: "*Terricola* was taken in a considerably different situation from *fulgida*. North of the river there are in many places bluffs of small aspens, and sometimes willows, these latter encircling small sloughs. Among these bluffs the grass is often of a tufted character, and the species in question was taken among these tufts. The ground here, too, was of a rather alkaline nature. This variety made no attempt to fly, but seemed to trust to losing itself in the grass, among which it ran with astonishing quickness."

Both *pusilla* and *terricola* were determined through the kindness of Prof. Wickham.

Lepida, Deg.—The larvæ of this species were discovered in pure drifting sand, often on the side of sand banks which were constantly moving with the wind. On the date when these were examined, September 28th, most of the burrows were still open, and the larvæ digging during the heat of the day; consequently there was much variation in the depth of holes. Large larvæ, probably second year, were found in soft sand at 66, 60, 58, 70 and 72½ inches below the surface. Small larvæ, first year, at from 30 to 32 inches in depth. Taking the deepest as a guide, these being the only ones closed at the top, we might expect wintering larvæ to be found at an average depth of 70 inches at least. The larvæ vary very much in size, doubtless due to food conditions. The larval life probably lasts two years, and the adults two months.

A NEW PROCTOTRYPTID IN THE FAMILY SCELIONINÆ.

BY G. E. SANDERS, URBANA, ILL.

Hoplogryon Bethunei, n. sp.—(Subfamily Teleasini, Genus Hoplogryon, Ashmead.)

Normal position: Male: Length, 2 mm., large for the genus.

General colour black, mandibles yellow, teeth brown, antennal bulb brown, base of scape brownish, remainder of antennæ black; articulation between coxæ and trochanters yellow, trochanters yellow, femur and tibiæ yellowish-brown, lighter at tips, tarsi yellowish-brown, remainder of body shining black.

Head two and one-half times as wide as thick, sparsely hairy. Cheek and lateral part of face coarsely, heavily, vertically striated, a portion of

the striæ being continued above, encircling the eye. Middle part of face between the eyes smooth and shining. Vertex about ocelli lightly striated. Clypeus coarsely, transversely striated. Mandibles with two equal acute teeth, the inner with small lobe at the base between the two.

Antennæ as long as body. Antennal bulb twice as long as thick. Scape of moderate thickness, reaching to ocelli. Pedicel as long as thick. Flagellum tapering slightly, first flagellar joint two and one-half times as long as thick, second twice as long as thick, the remaining eight one and one-half times as long as thick.

Thorax : Pronotum narrow from above, finely and densely punctate. Mesonotum heavily interruptedly striate longitudinally, moderately clothed with short, fine hairs. Scutellum coarsely roughened moderately clothed with short hairs. Postscutellum roughly tuberculate, spine of moderate size, tip slightly produced and thin.

Abdomen ovate. First segment as wide as long, coarsely and heavily striated longitudinally. Second segment as long as first, coarsely and heavily striated. Third segment as long as the two preceding together, and slightly more than one-third as long as the entire abdomen, slightly wider than long, the central half of the dorsal surface being coarsely but less heavily striated than the preceding two, the portion not striated smooth and sparsely hairy. The remaining segments very finely punctate and thinly covered with fine hairs.

Legs : Coxæ : outer or lateral surfaces smooth, inner surface covered with fine hair ; trochanters, femora and tibiæ normal : tarsi five-jointed, the first joint as long as the remaining four.

Wings reaching slightly beyond the tip of the abdomen, finely ciliated, pubescent and very slightly smoky, veins brown. Submarginal and marginal vein with a row of stiff hairs projecting forward beyond the edge of the wings.

Striæ on third abdominal segment, lobe between teeth, large size. long first flagellar joint and colour go to distinguish this species. It comes nearest to *H. longipennis*, Ashmead, and *H. tibialis*, Ashmead.

Described from one ♂ taken at Aurora, Ill., June 15th, 1909, in a nest of *Formica subrufa*. This, however, should not be taken as indicating definitely that the species is myrmecophilous.

Type deposited in Illinois State Laboratory of Natural History, Accession No. 39771. Named in honour of Prof. C. J. S. Bethune, Ontario Agricultural College, Guelph.

NOTES ON NORTH AMERICAN LYCOSIDÆ.

BY RALPH V. CHAMBERLIN, PROVO, UTAH.

From the list of North American Lycosidæ given by the author in his recent Revision, some names that he had placed in synonymy were inadvertently omitted. These are listed below, together with supplementary notes upon a few other forms, and some comments of more general character. A few species of Walckenaer, Tullgren and others are reserved for discussion as to synonymy in a subsequent article.

Pirata procursus, Montgomery (Proc. Acad. Sci., Phil., 1902, p. 583) = *Pardosa xerampelina*, Keyserling (Verh. z. b. Ges. Wien., 1876, p. 622).

This synonymy was noted in the Revision under *P. xerampelina*, but was omitted from the general list given in the early part of the work.

Pardosa solivaga, Montgomery (Proc. Acad. Sci., Phil., 1902, p. 574) = *Schizocosa ocreata*, Hentz (J. Bost. Soc. Nat. Hist., 1844, p. 391).

Like the preceding, noted previously in the Revision under the species, but omitted from the list.

Lycosa nidifex, Marx (American Naturalist, 1881, p. 396). The author placed this previously as a synonym of *Pikei (arenicola)* upon the authority of Banks, who presumably had access to Marx's types. Mr. Banks informs me that he now regards the species as distinct, a view which I can confirm fully from a study of a pair of individuals apparently representing it, and kindly sent me for identification from the American Museum of Natural History by Dr. A. Petrunkevitch. The form was not previously known to me at first hand. The copulatory organs present definable differences from those of *Pikei*, and more decided ones from those of *fatifera*, with which it also has affinities of a close kind. A description of the form, with figures of epigynum and palpal organ, follows:

Female.—Integument of cephalothorax dark reddish-brown without definite light markings, but the median dorsal portion of pars cephalica and the clypeus paler; the hair in specimens described mostly rubbed off. Chelicerae reddish-brown, like the cephalothorax, densely clothed with rusty-yellow hair with intermixed darker bristles. Labium and endites brown, both paler distally. Sternum and coxæ of legs beneath light yellowish-brown, clothed with light hair. Legs light yellowish-brown, entirely without darker markings, excepting that the ventral surface of anterior tibiæ, tarsi and metatarsi are darkened; densely clothed with gray hair with numerous longer dark coloured bristles, especially on joints

distad of the femora. Integument of abdomen light yellowish-brown, like that of the legs; dorsum with a solid black lanceolate mark at anterior end, which does not reach the middle caudad and which is truncate apically; anterior face and venter behind genital furrow black, the two areas connected laterally.

Face in height less than half the length of the chelicerae, which are massive and long; pars cephalica relatively wide, much as in *fatifera*; cephalothorax highest immediately back of the third eye row, from there slanting decidedly ventrad to second eye row in the anterior direction, and caudad descending gradually to dorsal groove, and then more abruptly descending as the posterior declivity to the posterior margin, the dorsal line gently convex between eyes and dorsal groove; face in profile appearing almost in a straight line with upper portion of chelicerae, not bulging over the bases of the latter.

First row of eyes distinctly shorter than the second (3.4:4); slightly procurved, the lower edges of the lateral eyes almost in a straight line with the lower or ventral edges of the median; anterior median eyes larger than the lateral (ad 5:7), scarcely their radius from each other and slightly farther from the lateral. Eyes of the second row about four-fifths their diameter apart. Dorsal eye area in length contained about 4.5 times in that of the cephalothorax.

Anterior tibiae armed beneath as usual, the spines short; a single short spine on anterior face. Patellae of first legs armed on anterior face with a single short spine. Tibiae of third and fourth pairs of legs without spines on dorsal surface.

For structure of epigynum see fig. 3.

Length of cephalothorax, 8.8 mm.; width, 6.25 mm.

Length of leg I, 20.8 mm.; tibia + patella, 7.5 mm.; metatarsus, 4.1 mm.

Length of leg II, 19.8 mm.

Length of leg III, 18.4 mm.

Length of leg IV, 24.5 mm.; tibia + patella, 8 mm.; metatarsus, 6 mm.



FIG. 3.—Epigynum of *Lycosa nidifex*.

Male.—Coloration in general as in the female. Ventral surface of anterior tibiae black, excepting proximally, the

ventral surfaces of metatarsi and tarsi also black. Tarsi of palpi reddish-brown.

Spines of legs longer relatively than in the female. Tibiæ of legs of the third and fourth pairs each with a long spine at proximal end and with one distad of the middle on dorsal surface.

For structure of the palpal organ see fig. 4.

Length of the cephalothorax, 8.5 mm.; width, 6 mm.

Length of leg I, 25.3 mm.; tibia + patella, 8.5 mm.; metatarsus, 5.7 mm.

Length of leg II, 22.6 mm.

Length of leg III, 21.9 mm.

Length of leg IV, 27.3 mm.; tibia + patella, 8.7 mm.; metatarsus, 7.2 mm.

Locality. — United States (inland). The specimens above described are from a locality not definitely known, but possibly from Arizona or Southern California. *Pikei* would appear to displace it on the seashore.

Prof. Montgomery's Species.—The female of *Lycosa nidifex*, above described, is seen to agree with *Pikei* and *fatifera* in lacking spines above on the tibiæ of the third and fourth legs, and would thus go into *Geolycosa*, Montgomery, as Banks defines it, while the male has these tibiæ armed above as usual, and must be separated from the female and referred to *Lycosa*. Thus the only definite character that has been suggested for the maintenance of *Geolycosa* as a genus is found not to be tenable, as on other grounds I have elsewhere stated, and as was to be expected from its nature. As the characters upon which Montgomery bases the genus originally are wholly intergrading, there appears at present no reason for maintaining it. As its author conceives it, it can be used only in an uncertain way and is not natural. *Carolinensis* being included in it, various other forms must also logically follow, and finally all species of *Lycosa*. Doubtless *apulæ*, the European species most close to *Carolinensis*, must be included with the latter wherever placed; but if so, the genus *Tarentula*, Sund., erected as long ago as 1833, with *apulæ* as the type, would have to be used in case of removal from *Lycosa*.



FIG. 4.—Palpal organ of *Lycosa nidifex*.

I believe, furthermore, that the other genera in the *Lycosidae*, as conceived and defined by Prof. Montgomery, are in some degree artificial and too indefinitely limited to be followed. Perhaps this may best be indicated by referring to some things in his own usage. Thus he is led to place his *humicolus*, in all fundamental structural features a typical *Pirata*, under the exotic genus *Aulonia*; describes (1902 and 1904) as a new species, *procursus*, under *Pirata* specimens of Keyserling's *xerampelina*, a strongly-marked *Pardosa*; in the same papers refers some specimens of *ocreatea*, Hentz, to *Pardosa* as a new species, *solivaga* and others to *Lycosa* as another new species, *Stonei*, etc. Then, again, he considers under *Lycosa* (1904) Keyserling's two species, *xerampelina* and *Mackenziana*, which are certainly naturally within *Pardosa* and well-marked representatives of this genus. It would seem possible in this last case that these species were simply taken up from literature, and that Prof. Montgomery did not perceive that Keyserling uses *Lycosa* where in our present nomenclature we use *Pardosa*.

Such facts as these doubtless explain some of the synonyms among the names proposed by Prof. Montgomery. Others result from the omission, or apparent omission, from consideration of the species described by Mr. Banks, as well as those of various other authors. Even in the case of Keyserling's species, which are all so fully described, and all of which Prof. Montgomery claims to include in his '04 paper, four are omitted. Then it would seem that he much underestimates the extent of variation in the group, and that differences due solely to ordinary individual variation and to variation with age are in some cases made the basis for separation of forms as species. This is the case, as I believe, with his three species, *euepigynata*, *insopita* and *Purcelli*, the differences being due to age, and all belonging to Keyserling's *pulchra*, which is preceded by Walckenaer's *gulosa*, as elsewhere pointed out. Prof. Montgomery mentions a certain difference in the relative length of legs, but such a difference appears in other species between younger and older specimens, together with differences in proportionate length of joints. Even though Hentz's *saltatrix* be not used—though it is clearly recognizable—Montgomery's *relucens* and *charanoides* had been previously described by Banks as *gracilis* and *humilis*; though Hentz's *fatifera* be not used, the form described as *latifrons* has long been designated by Banks as *Missouriensis*, and similarly Hentz's *milvina* was followed by *flavipes* of Keyserling and *nigropalpis* of Emerton before Montgomery wrote. Hence the intimation that these names were placed as synonyms only through the resurrection of very early ones is without foundation.

In one special direction, however, Prof. Montgomery has probably overestimated variation, namely, in regard to the tarsal claws. In his '04 paper this author calls attention to the great variability of the claws, and in substantiation refers to a paper prepared under his direction. An examination of this paper reveals as examples of great variation the description and illustration of the occurrence of a doubling in the claws, this occurrence being spoken of as "mutation." Probably had the eyes of the same specimens been carefully examined, they also would have been found to have doubled, for, as will be clear to most students of the Arthropoda, the doubling was due simply to the fact that the spiders were moulting.

In dealing with Prof. Montgomery's species I may say that I have studied with care co-types sent me by him in 1904 of nearly all, and the statement made by that author that I had not seen any of the type specimens in his private collection is consequently misleading, for co-types labelled in his own hand should certainly be practically as reliable as those that may have been chosen for preservation as types. A few types which Prof. Montgomery felt he could not loan through the mails, furthermore, represent almost the only described species of North American Lycosidæ, of which types are known to exist and to be available which I have not studied with care.

Quite on the contrary, indeed, had it not been precisely for this study of types or cotypes, I must have regarded more of Prof. Montgomery's species as good. Every worker has a certain "personal equation" which must be considered, and a description must be interpreted in accordance with the preponderating, consistent evidence of the whole as against the contradiction of a part. Prof. Montgomery quotes from his own published descriptions to substantiate his contention for the specific separateness of certain forms; but to show the folly of regarding recorded observations absolutely and as necessarily correct and authoritative, there may be mentioned wide differences of statement concerning the same character in the same species, and even in the same identical specimen where Prof. Montgomery writes of it at two different times. Thus, in his paper of 1902, p. 538, in describing *Lycosa nigra*, Stone, he writes: "Eyes of the second row largest, less than their diameter apart," while concerning the same form in 1904, p. 285, he writes: "Eyes of second row largest, almost 1.5 times their diameter apart." Also in the first place he says concerning the first eye row: "Middle eyes larger and higher than the

lateral," while in the second the corresponding statement is: "First rowstraight." The species *contestata* (which, as before mentioned, is *pratensis*. Em.) was based on a single specimen, concerning which, in the paper of 1903, p. 649, it is written: "*Dorsal eye-area more than 1.5 the length of the cephalothorax*," while in 1904, p. 649, the statement is: "*Dorsal eye-area to the cephalothorax as 1:6*." Also in the first place: "*The length of the chelicera is about twice the height of the head in front*," while in the second he writes: "*Chelicera fully 2.5 times the height of the head in front*," etc.

COLLECTING BEETLES IN MEXICO.

BY FRANK R. MASON, GERMANTOWN, PA.

Although very much neglected in an entomological sense, the great Republic of Mexico, comprising nearly eight hundred thousand square miles of territory, is a fascinating field for the collector. It has been my good fortune to visit the country several times, but my trips have always been more or less hurried, so that collecting has been a side issue to which I should like to have devoted more time. It might be well to say that I only collected Coleoptera.

This last summer my way led southward from St. Louis through Texas, entering Mexico by the Laredo gateway. Our first stop-over was at Monterey, that city which has been so ravaged by fire and flood. Nothing especially interesting entomologically was turned up here, the fauna being practically Texan for some distance south of the Rio Grande. *Aphonus tridentatus*, Say, several species of *Ligyris* and *Xyloryctes satyrus*, F., found their way into the potassium jar; *Euphoria basalis*, D. & G., was common on a species of cactus, while *Cotinis mutabilis*, Gory, was in great numbers, like swarms of bees, around the mimosas.

Two hundred and fifty miles further south, at San Luis Potosi, conditions were much the same: the same arid, semi-desert plateau country, with ranges of bare, jagged mountains always in view. A flying trip over the Tampico division of the Mexican Central Railway added to our captures a fine specimen of *Antichira lucida*, Ol., which flew in through the car window: I had some specimens of this in my collection from Brazil. Numerous *Heliconii*, *Victorina stelenes* and other unfamiliar tropic Lepidoptera were flying in the open forest glades in a most tempting way. From a scenic standpoint this journey from Cardenas down through the Tamasopo Canyon is probably one of the finest in the world.

January, 1910

One drops down in a few hours from the high desert country into all the luxuriant vegetation of the Gulf coast. The air is moist and humid from almost constant rainfall, and Nature seems fairly to have outdone herself in the wild riot of growth.

Again retracing our steps to San Luis Potosi, the next point at which I had any opportunity of collecting was in the neighbourhood of Lake Chapala, near Guadalajara, in the western part of Mexico. *Calosoma angulatum*, Chev.; *Epilachna Mexicana*, Guer.; *Pelidnota virescens*, Burm.; *Acanthoderes funeraria*, Bates; *Taricanus Truquii*, Thom.; *Calligrapha serpentina*, Rg.; *C. diversa*, Stl.; *Zygogramma malva*, Stl.; *Leptinotarsa Haldemanni*, Rg., and numerous other Phytophaga (as yet undetermined) were among our captures. Also *Trachyderes elegans*, which would light on the upper branches of the thorn trees in a most provoking way. Several species of *Macroductylus* were found in the gardens.

Cicindelidæ I always found to be very scarce; it may be I was never at the right season for them. *Cicindela flavopunctata*, Chev., and *C. mellyi*, Chd., I collected near Oaxaca, in southern Mexico, but they are the only ones. At Necaxa, in the State of Puebla, was found the remarkable *Chrysina macropus*, Franc.; in the male the hind femora are so enormously developed that it gives the beetle the appearance of walking on stilts. The species normally is a delicate apple-green colour, though some of the specimens are speckled like an egg.

But of all the collecting I have done in Mexico, the vicinity of Cordoba, in the State of Vera Cruz, has yielded the largest number of species. Take this section of the country from Motzorongo to Jalapa, and as far west as the town of Orizaba, at an elevation of 4,000 feet, one finds an ideal tropical country, a healthy climate, with all the rich and beautiful growth of the torrid zone, and but few of the disadvantages. Almost nightly rainfall or dense mists blown in from the Gulf keep things green and fresh. The graceful cone of Orizaba volcano, nearly 18,000 feet above sea level, is almost always in view, and its snow-covered summit forms a striking contrast when seen from the forests of the low-lands. Collecting at the electric lights, with which the plazas in even the smaller towns are supplied, yielded such interesting things as: *Acrocinus longimanus*, L. (the harlequin beetle of the Amazon); *Callipogon senex*, Dupont; *Dynastes hyllus*, Chev.; *Xyloryctes telephus*, Burm.; *X. furcatus*, Burm.; *Coelosia biloba*, L.; *Heterogomphus Chevrolati*, Burm.; *Podischnus tersander*, Burm.; *Strategus Julianus*, Burm.; *Golofa*

Pizarro, Hope; *Cyclocephala mafaffa*, Burm.; *C. stictica*, Burm.; *C. sanguinicollis*, Burm.; *Enema pan*, F., and several other species of which I am uncertain. Beating in the woods and undergrowth was equally productive: *Mallodon dasystomus*, Say; *Teniotus Luciani*, Th.; *Trichophorus Chevrolati*, Guer.; *Callichroma melancholica*, Bates; *Iammoderus ornator*, Bates; *H. spinipennis*, Thoms.; *Ptychodes politus*, Serv.; *P. trilineatus*, Linn., and *Lagochirus araneiformis*, L., are some of the Cerambycidae obtained in this way. Chrysomelidae were also plentiful, including *Chalcophana cincta*, Har.; *Colaspis prasina*, Lefev.; *Monocesta ducalis*, Clark; *Diphaulaca antica*, Ol.; *Diabrotica Curtisi*, Baly; *Lactica Chevrolati*, Jac.; *Mesomphalia illustris*, Boh.; *M. Lebasi*, Boh.; many species of *Lema*, *Haltica*, etc.

The country around the city of Vera Cruz I found unproductive; it is low, sandy, with very little forest, not to mention the heat, which is sometimes terrific. One would do far better to go inland to the wooded country, say about 2,000 feet in elevation.

The return trip from Vera Cruz to New York was made by sea. Much to my regret, we were not permitted to land in either Progreso, Yucatan nor Havana; there being yellow fever in Vera Cruz, we were quarantined against all intermediate ports.

In the above short account by no means all the species found are mentioned; I realize the subject has been merely touched on. If I have but aroused the interest of some other collector to work the field more thoroughly, I shall be satisfied.

CORRECTION.

In my "Key to the North American Species of *Æshna* found north of Mexico" (CAN. ENT., Vol. XI., pp. 377-391, 450 and 451), several more or less serious errors occur. The gravest of these appear in the measurements of the abdomen and wings, which must have been made with a faulty millimetre scale, as they are all too small by some 3-5 mm. The smaller measurements of appendages, genitalia, etc., have not suffered perceptibly by the defect in the scale. They will all appear correctly in my final revision of the genus. Other errors in the paper which can be corrected here are the following:

Page 378, seventh line from top, for *cephalad* read *dorsad*. Page 379, third line from bottom, and page 380, fifth line from top, for *A₁ at its origin and the anal triangle*, read *A₂ and A₃ at their origin*.—E. M. W.

THE BEE FAUNA OF CALGARY, ALBERTA.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

I am indebted to Mr. F. H. Wolley Dod for a small but interesting collection of bees, which he obtained this year at Calgary. While there is nothing new to science, the collection is worth recording on account of the light it throws on the bee fauna of that region. The fauna is a composite one, with elements which seem to have been derived from different directions. It may be roughly divided into groups as follows:

1. Alaskan type.

Bombus flavifrons dimidiatus, Ashm.—Three females, June 15-21. The connection of this insect with *flavifrons* was discovered by Mr. Franklin, who will give full particulars in his forthcoming monograph.

2. Pacific Coast type.

Bombus Californicus, Cresson.—Four females, June 14-20, one at flowers of purple columbine in garden. These show variable indications of pale hair on the scutellum, and are thus transitional to the Rocky Mountain *B. dubius*.

3. Types characteristic of the North-eastern States.

Bombus consimilis, Cresson.—One female, July 14.

Bombus terricola, Kirby.—Two females, June 2 and July 14. Originally described from 65° n. lat.

Halictus Provancheri, D. T., and *Halictus albipennis*, Rob.—Females of each, June 14.

4. Types characteristic of the Rocky Mountains, though some are more widely distributed.

Psithyrus insularis, Smith.—Goes west to Vancouver Island.

Bombus bifarius, Cresson.—Five females, May 25, at bearberry. Very finely coloured specimens.

B. Edwardsii Cooleyi, Morrill.—One female, May 27, at bearberry. The relationship to *Edwardsii* was made out by Mr. Franklin, though I believe he does not employ the varietal name.

B. flavifrons, Cresson.—Six females, June 13 to 21. One at purple columbine in garden.

B. Nevadensis, Cresson.—Two females, June 22.

B. rufocinctus phaceliæ, Ckll.—One female, June 15.

B. rufocinctus astragali, Ckll.—One female, June 14.

SOME NEW AND RARE DIPTERA FROM WISCONSIN.

BY S. GRÆNICHER, PUBLIC MUSEUM, MILWAUKEE.

Two of the species considered in this paper were found in the eastern part of Wisconsin. The others were taken last summer in the north-western part of the State by the collecting expedition of the Milwaukee Public Museum down the St. Croix River.

Zodion lativentre, n. sp.—Length about 7 mm. Thorax black, with dark gray pollen. Abdomen broad, mostly dark red. Front reddish-yellow below, darker above, slightly pollinose along the sides. Occiput black. The black pile of the latter is longer and more dense than that on the front. Antennæ red, with a dark arista. Face and cheeks entirely yellowish. Cheek nearly as broad as the vertical diameter of the eye. Proboscis black, not quite twice as long as the head. Thorax with two broad, black, abbreviated, and widely separated stripes. Between these there are two narrow shining black stripes, extending from the suture to the front part of the thorax. Scutellum rounded, dark pollinose. The pleurae are covered with pollen of a lighter shade than that on the mesonotum. First segment and anterior half of second segment of abdomen black, opaque. The rest of the abdomen is dark red, except the sides of the fourth and fifth segments, which are blackish. A narrow median pollinose stripe extends from the black area of the second segment to the fifth segment. All of the segments with more or less gray pollen on their sides. Hairs on thorax and abdomen all black. Legs red, with the exception of the upper surfaces of the front femora, which are black. Colour of the tarsi darker towards their tips. Wings with a brownish tinge, and an open first posterior cell. This species runs in Adams' table of the species of *Zodion* to No. 9 (Kans. Univ. Sc. Bull., II, 32), but it is quite distinct from any of the three species occupying that part of the table. Its colour and broad oval abdomen, taken in connection with its size, render it easily recognizable.

A single specimen, a male, was taken July 13, 1909, near the mouth of the Yellow River, Burnett Co., by the Milwaukee Publ. Mus. coll. exped. It is deposited in the collection of the Museum.

Anthrax Nemakagonensis, n. sp.—Length, 8-10 mm. Black: first antennal joint, lower part of face, and legs reddish. Front yellow tomentose and black pilose. First joint of antennæ twice as long as

second, third elongate-conical at its base. Epistoma greatly produced, sparsely covered with yellow tomentum. Proboscis not surpassing the oral margin. Occiput beset with yellow tomentum. Thorax with yellow tomentum, and copious long pile of lighter colour on the anterior margin, along the sides and on the pleuræ. There is a distinct patch of white pile, beginning above the root of the wing, passing around in front, and ending on the pleura below the root of the wing. In some specimens the patch is present on the pleura only. Bristles at the posterior angles of the thorax yellow, those along the posterior margin of the scutellum black. The tomentum of the scutellum is yellow. Abdomen with a mixture of black and yellow tomentum, the latter colour prevailing, the black mostly on the middle of the second, third and fourth segments. Light yellow pile on the sides of the abdomen, except at the posterior angles of the second, third, fourth and fifth segments, where it is black. Venter black, with yellow tomentum. Front tibiæ bristly. Legs yellow tomentose. Reddish colour of the legs changing to black on coxæ and tarsi. Claws of front tarsi distinct. Basal portion of wings brown, the apical portion entirely hyaline. The outline of the brown colour extends in a more or less broken line from the apex of the auxiliary vein to a point on the hind margin of the wing, situated a little inside of the apex of the axillary cell. Apex of the anal cell hyaline in all of the specimens, that of the axillary cell distinctly hyaline in some of the specimens only. A round hyaline spot at the antero-exterior angle of the second basal cell.

In the distribution of the brown colour on the wing, as in several other characters, this species comes close to *A. perplexa*, Coq., a Californian species. It differs from that, however, in having a shorter proboscis, yellow tomentum on the occiput, black bristles on the scutellum, and in some other points of minor importance. In the description of *A. perplexa* no mention is made of a hyaline spot in the second basal cell, a character which is present in each of the specimens of *A. Nemakagonensis*. This species is not rare in the St. Croix region. Sixteen specimens, all of them in the collection of the Milwaukee Publ. Mus., were taken last summer by the collecting expedition of that institution as follows: Four, July 25, near the mouth of the Nemakagon River, Burnett Co.; ten, July 28-30, near the mouth of the Yellow River, Burnett Co.; one, Aug. 4, near the Kettle River Rapids, Burnett Co., and one, Aug. 6, at Randall, Burnett Co.

Phthiria Aldrichi, Johnson.—(Psyche X, pp. 184-185.) On July 23, 1907, I collected at Cedar Lake, Washington Co., Wis., two female

specimens that are smaller than those from the type locality (Caldwell, Idaho), being about $2\frac{1}{2}$ mm. long, but undoubtedly belong to this species. In their markings they differ slightly from the type, as seen from the following: First joint of antennæ yellow; basal two-thirds of second joint black, the tip yellow; third joint black, with a very narrow yellow base. In one of the specimens the front, except ocellar tubercle and the face, entirely yellow; in the other there are three minute parallel dark lines running from the ocellar tubercle to within a short distance of the antennæ. Prof. Aldrich, who furnished the type specimens, states (*Psyche*, loc. cit., p. 185) that he collected them on a white sand bar along the Boise River at Caldwell, Idaho, June 24, 1901. It is very pale in life, and flies just like the drifting of the sand, close down and a short distance at a time. It is a fine instance of protective coloration. The male has beautiful purple eyes in life. My specimens were taken during the hottest hours of the day at the flowers of *Rudbeckia hirta*, in a sand pit on the southern slope of one of the numerous moraines that form the characteristic features of the topography of that region.

Pyrophæna, Schiner.—In its geographical distribution this genus is restricted to the boreal areas of Europe (probably Eurasia) and North America, and is represented by two species only, both of which seem to be of rare occurrence in both hemispheres.

P. rosarum, Fabr.—Osten Sacken referred to this species in his Catalogue of N. Am. Diptera (1878) as having been found in the White Mts. of New Hampshire and in Massachusetts, but since that time it has not been reported from any part of this continent, and Prof. Williston states in his Synopsis of the N. Am. Syrphidæ that he does not know the species. A male specimen collected by the writer, June 5, 1898, in a tamarack swamp at Elkhart Lake, Sheboygan Co., Wis., evidently belongs here. It has a length of 9 mm. The two yellow spots on the third abdominal segment are narrowly separated, rounded posteriorly, and occupy the anterior two-thirds of the segment. In addition to these there are two faint and much smaller spots on the fourth segment that are widely separated, and take up hardly the anterior third of the segment. The occurrence of such spots on the fourth segment is not mentioned in the original description, but otherwise the specimen agrees very closely with the description.

P. granditarsus, Forster (*P. ocymi*, Fabr.).—A male specimen in the collection of the Milwaukee Publ. Mus. was taken by the Museum coll. expd. July 25, 1909, near the mouth of the Nemakagon River, Burnett Co. This male shows the black spots on the posterior angles of the second and third abdominal segments, which are referred to in Prof. Williston's description (Synopsis of the N. Am. Syrphidæ, p. 56), as occurring in the female, but not in the male sex. This species is to all appearance not quite as rare as the preceding, it has been reported so far from several points in Canada, New Hampshire (White Mts.), and Massachusetts in the Eastern, and Washington in the Western United States.

SOME RECORDS OF HETEROPTERA.

BY J. R. DE LA TORRE BUENO, NEW YORK.

I am indebted to the kindness of Mr. R. P. Dow for the insects enumerated hereafter, which were taken the past summer. There is nothing extraordinary about them, but they show the distribution of certain species. From De Bruce, Sullivan Co., New York, the following are recorded :

Thyreocoris unicolor, P. B.

Euschistus fissilis, Uhler.

Thyreocoris lateralis.

Podisus cynicus, Say.

Euschistus variolarius, P. B.

From Claremont, N. H., came the following :

Homæmus ceneifrons, Say.

Nysius angustatus, Uhl.

Eurygaster alternatus, Say.

Phlegyas abbreviatus, Uhl.

Perillus circumcinctus, Stal.

Ligyrocoris contractus, Say.

Podisus modestus, Dallas.

Lygæus kalmii, Stal.

Podisus serieventris, Uhl.

Calocoris rapidus, Say.

Cosmopepla carnifex, Fab.

Capsus ater, Linn.

Mormidea lugens, Fab.

Aneurus inconstans, Uhl.

Euschistus fissilis, Uhl.

Sinea diadema, Fab. (Nymphs.)

Euschistus tristigmus, Say.

Triphleps insidiosus, Say.

Alydus eurinus, Say.

It will be noted that the newer synonymy has not been employed, this being done in order to facilitate reference to Prof. Uhler's "Check List," and Lethierry and Severin's "Catalogue Général."

BOOK NOTICES.

CONTRIBUTIONS TOWARDS A MONOGRAPH OF THE SCOLYTID BEETLES.

1. The Genus *Dendroctonus*, by A. D. Hopkins, Ph. D.

This excellent monograph of the genus *Dendroctonus* was issued by the United States Department of Agriculture as Bulletin 17, part 1, of the Bureau of Entomology. It contains 164 text pages, eight full-page plates, and 95 text figures. The genus *Dendroctonus* had previously been dealt with by Dr. Leconte, in 1868 and 1876, and by Dr. Dietz in 1890. Now, after a long study of a large amount of material, including the available types, Dr. Hopkins has completely revised the classification, described several new species, and the younger stages of many, and has allotted the references in literature to their proper titles. In short, he has given us a complete and scholarly monograph of the genus, lacking only the bionomic features, which are promised for a future paper.

The first portion of the work deals with the history of the genus, the original description by Erichson, and a revised description by the author. The last extends over sixty pages, and includes forty-four excellent figures. The figures, with the exception of two, deal with the external and internal anatomy of the adult and larva of *D. valens*, and with the external characters of the pupa. This series of drawings is by far the finest yet published on the anatomy of the Scolytid beetles, and will be of great assistance in future descriptive work in the Scolytidæ.

"In all of this anatomical work the object of the author has been to acquire direct information on the facts as they exist in the subjects examined; such information to furnish a basis for the determination, naming, description and illustration of the anatomical elements as represented in the Scolytid beetles, and at the same time to serve as a guide to the determination of further facts relating to insect anatomy in general."

The text of this portion of the work presents many points of much interest to students of insect anatomy, too many even to mention in this short review.

The reversal of secondary sexual characters within the genus, referred to on page 52, is particularly interesting, as is also the discussion of "Progressive Modifications," with the accompanying plates of eyes, antennæ and tibiæ.

The variation in the epistoma of *D. valens*, as illustrated in fig. 10, will prove interesting to those familiar with the genus. It will be remembered that Dr. Dietz based his classification of this genus largely upon the characters of the epistoma, which he considered of specific value. I have never been able myself to find any such variations as Dr. Hopkins has figured. Thus again is emphasized the value of a long series of specimens in a study of this nature.

The last half of the work deals with the description and classification of the species. Including the new forms described, twenty-four species are now contained in the genus. The method of treatment is systematic and thorough. The species are usually discussed under the following sub-heads: Adult, Variations, Distinctive Characters, Pupa, Larva, Galleries, Distribution, Host Trees, Identified Specimens, Bibliography and Synonymy. A drawing of the adult and a chart showing the distribution are given in each case, and usually excellent figures of the galleries are included.

The bewildering tangle heretofore presented by the literature dealing with several of the species has been cleared up completely, and the "Revisional Notes" under certain of the species are invaluable.

Useful tables are given of the Secondary Sexual Characters, Pupal Characters, Larval Characters, Gallery Characters, Distribution, Relation of Species to Host Trees, and of the Host Trees themselves. A very complete Bibliography of the genus is given at the close.

More detailed descriptions of the new species described might perhaps have been desirable, in view of future descriptive work, and the key to the adult, while excellent, seems to present a few weak points; however, a perfect key to the genus *Dendroctonus* is hardly to be expected in this life.

The work throughout is systematic and complete, one of the best productions of its kind yet given us by American Entomologists.

All students of the Scolytidæ will look forward with the greatest pleasure to the completion of Dr. Hopkins's "Monograph of the Scolytid Beetles."—J. M. SWAINE.

OUR INSECT FRIENDS AND ENEMIES: By John B. Smith. Lippincott Co., Philadelphia. (\$1.50.)

This book of 314 pages is the most interesting and comprehensive, popular and yet scientific account of insects as the friends or enemies of man, that we have yet seen,

In the first chapter the author defines what is meant by an insect, and for convenience divides all insects into eight orders. In following chapters he takes these orders in turn and discusses their beneficial or injurious relationship to plants, to man and to other animals. In addition, chapters are devoted to an account of the natural forces that keep insects under control, especially where the balance of nature is not disturbed by man. Of special interest in this connection is his description of the part played by parasites, by climate and by disease in checking increase.

The author's remarks on birds are likely to cause a good deal of criticism from bird admirers. He attributes to the feathered tribe much less importance than most writers on the subject would give them. In doing so, however, he states explicitly that birds have an important function to perform in connection with insect control, but that so far as our worst pests are concerned, their value has been greatly exaggerated. If birds are of less importance than many think, much less value, he claims, is to be attributed to protective coloration than popular opinion would give it.

The part dealing with insects as carriers of disease is full of valuable information, obtained from the results of the most recent investigations. Household insects come in for a good deal of attention, nearly all the species found being discussed and remedies suggested, so that this is a very valuable chapter.

Throughout the book Dr. Smith has never lost sight of the economic aspect, and the numerous references to individual species of an injurious nature are made more valuable by the suggestions for control which almost invariably follow.

The last chapter is called "The War on Insects," and is a resume of all the most up-to-date methods adopted by man for controlling injurious species.

The value of the book is considerably increased by frequent illustrations. Entomologists will find this work a boon to them, inasmuch as it brings within handy reach a mass of valuable information that is frequently required, and that would otherwise be obtained only through much searching. The general public will find it a most interesting revelation of a new world of marvellous interest, into which they have found it difficult to get more than a mere glance in popular books. The book should be in every farmer's home, and in every school and college library.—L. C.

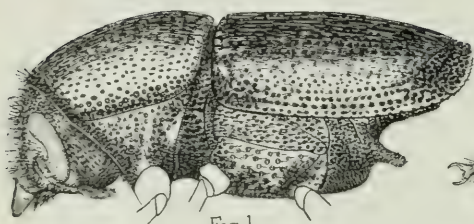


Fig. 1

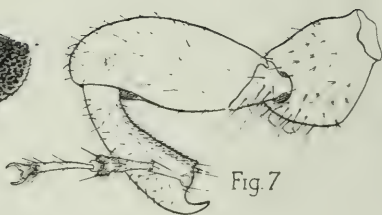


Fig. 7

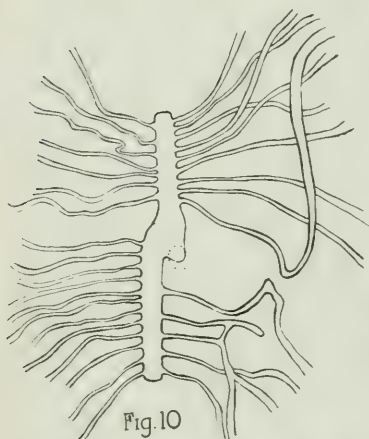


Fig. 10



Fig. 8



Fig. 5



Fig. 6

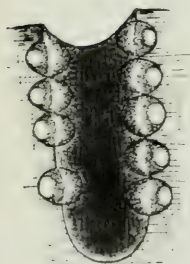


Fig. 11

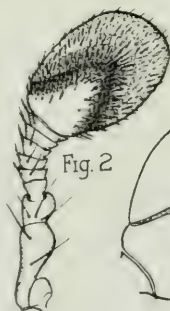


Fig. 2



Fig. 3

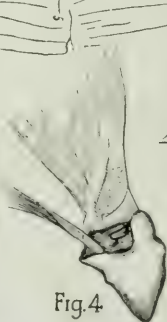


Fig. 4



Fig. 9



Fig. 12

ECCOPTOGASTER PICEAE, N. SP.

The Canadian Entomologist.

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No. 2.

A NEW SPECIES OF *ECCHOPTOGASTER*.

BY J. M. SWAINE, MACDONALD COLLEGE, P. Q.

The beetle here described is interesting as being the first species of its genus recorded from conifers in eastern North America. In the west *E. unispinosus* occurs in *Pseudotsuga*, and possibly in *Larix*, and *E. subscaber* and *E. præceps* occur in *Abies*. The food-plants of *E. ventralis* and *E. Californicus* have not been recorded. Of the eastern species, *E. fagi* is found in *Celtis* and *Fagus*, *E. muticus* in *Celtis*, *E. quadrispinosus* in *Hicoria*, and *E. rugulosus* in *Prunus*, *Pyrus* and *Crataegus*. The food-plants of *E. sulcatus* have not been recorded.

The species was found at Hudson, Que., May 24th, 1909, in branches of *Picea Canadensis*. Full-grown larvæ and pupæ were abundant in the ends of the larval galleries, but adults had not then appeared. Adults emerged from sticks in the laboratory on June 6th, and egg-laying under natural conditions commenced early in July in branches which had been broken by winter storms. No tunnels were found in living bark nor in limbs which I had girdled in May.

The egg-tunnels deeply score the wood lengthwise of the grain. The tunnels are divided into two portions by a nuptial chamber, situated usually near the middle, and from the nuptial chamber a short oblique tunnel leads to the entrance-hole above. From ten to thirty eggs are laid in shallow niches along each side of the tunnel, and well packed in with fine bits of wood. The larval galleries arise from the tunnels in a fairly regular manner, but soon through their windings cross each other in every direction, but still show a general tendency to follow the grain of the wood, which they deeply score. The pupal cells at the ends of the galleries are more or less deeply sunk into the wood, and are usually parallel with the surface, though sometimes oblique.

This species is most closely allied to *E. unispinosus*, but is easily separated by the shape and position of the ventral spine. In *unispinosus* the spine is flattened in the male, and the base of the hind margin attains the caudal margin of the segment. The shape is roughly triangular,

narrowed outwards to a rounded apex. In the female the spine is reduced to a carina, in a like position. The ventral spine of *picea* arises always from the middle of the nearly perpendicular face of the second sternite, and the base of the spine does not attain the caudal margin of the segment. In *picea* the caudal margins of the third and fourth sternites are not so strongly, and that of the fifth is much more strongly ridged.

The type specimens, male and female, will be placed in the Cornell University collection.

Eucoptogaster picea, n. sp.—Length, 2.2 mm. to 3 mm.; width, 1 mm. to 1.3 mm.; sides parallel; shining black, or nearly so; elytra sometimes with reddish tinge; antennae, tarsi and portion of the mouth-parts yellowish. Head shining, subglobular, imbedded in the prothorax. Genae punctured more strongly near the eyes and behind (beneath the pronotum), striate dorso-ventrally, striae anastomosing. Eyes elongate, broadly emarginate in front. Dorsal face of the head with large punctures extending to the caudal margin. Antennal scape short, first segment of funicle globular, remaining six segments of funicle close-fitting and gradually wider distad. club pubescent, sub-oval, sutures strongly angulated, first suture deep, second very faint, a strongly-chitinized piece deeply imbedded in the inner half of the first suture. Front of the female slightly flattened, roughened with large, deep punctures, and intervening, sub-parallel ridges, which converge slightly cephalad. The punctures bear slender, yellowish hairs of nearly equal length. A tuft of stout, yellow hairs projects cephalad over the mandibles from the raised epistoma. In some specimens a slightly raised elongate tubercle is formed by the ridges on the middle line. The front of the male is much more strongly flattened and more densely and coarsely punctate.

Pronotum smooth, shining, glabrous, except for a few hairs near the edge, black, except for a reddish tinge around the anterior margin; caudal margin broadly rounded above, finely margined and faintly bisinuate, sides slightly rounded, gradually narrowed cephalad, and moderately constricted about the anterior margin. Side margins sharp and distinct, forming a continuation of the slightly raised caudal margin, and extending nearly the entire length of the pronotum. Venter of the prothorax coarsely punctured, more densely in front, sparsely hairy, concave on each side, smooth next the coxae and on the caudal margin. Fore coxae prominent, moderately separated and hairy.

Scutellum large, triangular and depressed.

Elytra black, with a reddish tinge in younger specimens, sides nearly parallel, posterior outer angles rounded. Disc glabrous, sides and caudal depression sparsely hairy. Elytra deeply impressed about the scutellum, punctate-striate, the striæ distinct and deeper at the base; interspaces also punctate-striate with smaller punctures. On the sides the punctures are less regular and the striæ less distinct. At the base the elytra are thickened and roughened by larger punctures. On the slightly depressed caudal sixth the striæ become confused and the surface is rough, with large, close-set setigerous punctures.

Mesoepisternum with coarse punctures, from each of which arise two hairs. Mesoepimeron more finely punctate, the punctures also with two hairs. Metasternum coarsely punctate, with single, stout setæ. Metaepisternum more finely punctate, with the central punctures bearing single, long setæ, and those near the margin two much finer setæ.

Venter of the abdomen coarsely punctate with slender setæ, very strongly excavated caudad of the first sternite. First and second sternites fused; second sternite nearly perpendicular, about as wide as the first, and bearing from the centre a blunt spine, slender, and pointing obliquely downward in the male, much shorter and conical in the female; third and fourth sternites each shorter than the second, and smooth on the caudal margins; fifth sternite longer than the third and fourth united, concave and strongly margined behind, more strongly in the male.

EXPLANATION OF PLATE 2.

Eccoptogaster piceæ, n. sp.

- Fig. 1.—Male.
- Fig. 2.—Antenna.
- Fig. 3.—Antennal club.
- Fig. 4.—Mandible.
- Fig. 5.—Labium and maxillæ from below.
- Fig. 6.—Labium from above.
- Fig. 7.—Fore leg, tarsus retracted.
- Fig. 8.—Fore tibia, inner side, showing the slight ridges.
- Fig. 9.—Side view of abdomen, ♀.
- Fig. 10.—Primary- or egg-tunnel, showing the bases of the larval galleries.
- Fig. 11.—Portion of egg-tunnel, showing eggs packed in wood-chips
- Fig. 12.—Egg.

FIFTH MEETING OF THE ENTOMOLOGICAL SOCIETY OF AMERICA.

The fifth meeting of the Entomological Society of America was held at the Harvard Medical School, Boston, Dec. 30th and 31st, 1909. The President, Dr. Henry Skinner, presided throughout the sessions. The President announced the deaths of Henry H. Edwards, an Honorary Fellow; Prof. Mark Vernon Slingerland, a Fellow; B. H. Guilbeau, W. Brodie and H. M. S. Seib, members. Suitable resolutions on the deaths of Mr. Edwards and Professor Slingerland were adopted. The report of the Executive Committee showed among other things that 16 new members had been received during the year and 22 memberships had terminated, not including those who had died. Also that a memorial drawn up by Mr. N. C. Wood regarding the tariff on insects and signed by the President and Secretary, had been productive of no action by Congress.

The question of appointing delegates to the approaching International Congress of Entomology was referred to the Executive Committee.

The following officers were elected :

<i>President</i>	-	-	Dr. John B. Smith.
<i>First Vice-Pres.</i>	-	-	Dr. S. A. Forbes.
<i>Second Vice-Pres.</i>	-	-	Prof. V. L. Kellogg.
<i>Secretary-Treasurer</i>	-	-	Mr. C. R. Crosby.

Additional Members of the Executive Committee :

Prof. J. H. Comstock,	Prof. J. M. Aldrich,
Dr. W. M. Wheeler,	Rev. Prof. C. J. S. Bethune,
Mr. E. A. Schwarz,	Prof. Lawrence Bruner.

Member of the Committee on Nomenclature :

Prof. T. D. A. Cockerell (to succeed himself).

The report of the Committee on Nomenclature concerning the nomenclature of Gall Insects, read at the Baltimore meeting and printed in the Annals for 1909, was adopted as printed, with the provision that the Society express itself as standing with the majority of the Committee in Section V.

Mr. Brues suggested that Prof. Felt submit a list of names of Gall Insects that he thought could be accepted as standard.

Moved and carried that the request of Dr. Stiles, published in Science, for the preparation of a list of one hundred important names to be adopted by the Congress of Zoology as standard, be referred to the Executive Committee.

The following amendment to the Constitution was adopted :

Article V, Sec. 3.—Election of officers. All officers shall be elected by ballot at the annual meeting for the term of one year, and shall be eligible for re-election. Their term of office shall commence with the first of June following their election.

The Secretary was instructed to take a mail vote of all members and Fellows of the Society as to whether the present arrangement of paying separate dues and subscriptions to the Annals should be continued, or a single membership fee of two dollars be charged, and members receive without further expense the publications of the Society.

Professor Sanderson suggested the adoption of a uniform style of button for both the entomological societies meeting in affiliation with the American Association for the Advancement of Science. Referred to the officers.

The following papers were read during the sessions :

R. MATHESON.—“Remarks on the External Anatomy of the Haliplidæ.”

W. M. WHEELER.—“On the Effects of Parasitic and Other Kinds of Castration in Insects.”

A. H. MORGAN.—“Some Correlations of May-fly Structure and Habit.”

C. R. CROSBY.—“Some Observations by the Late Professor Slingerland and the Speaker on the Life-history of *Heterocordylus malinus*.” (Read by title.)

C. J. TRIGGERSON.—“The Life-cycle of the Oak Hedge-hog Gall-fly (*Acraspis erinaces*).”

F. L. WASHBURN.—“A Jumping Seed-gall on the Burr Oak.”

A. D. MACGILLIVRAY.—“The Female Reproductive Organs of *Corydalis cornuta*.”

W. L. W. FIELD.—“The Offspring of a Captured Female of *Basilarchia proserpina*.”

H. H. LYMAN.—“An Improved Drawer for Insect Cabinets and a New Substance for Lining Them.”

C. T. BRUES.—“Some Notes on the Geological History of the Parasitic Hymenoptera.”

J. C. BRADLEY.—“The Plaiting of the Wings of Hymenoptera”

T. J. HEADLEE.—“An Apparatus for the Determination of Optimums of Temperature and Moisture for Insects.”

A. D. MACGILLIVRAY.—"The Radial Sector in *Phlebotrophia Mathesoni*."

W. T. FORBES.—"A Structural Study of Some Caterpillars."

M. J. ELROD.—"The Blackfoot Glacier as an Entomological Burying-place." (Read by title only.)

J. J. DAVIS.—"*Chaitophorus populifoliae*, Fitch, versus *Chaitophorus populifoliae*, Oestland." (Read by title only.)

L. HASEMAN.—"The Life-history of a Species of Psychodidæ." (Read by title only.)

A. G. HAMMAR.—"Notes on the Life-history of *Fidiobia flavipes*, Ashmead, an Egg Parasite of the Grape-root Worm (*Fidia viticida*, Walsh)."

A very interesting and extensive exhibition was held in conjunction with and under the auspices of the Cambridge Entomological Club in rooms adjoining the meeting hall.

The Annual Public Address was given by Dr. John B. Smith on the evening of December 30 in the hall of the Boston Society of Natural History. Title, "Insects and Entomologists: Their Relations to the Community at Large."

On Tuesday evening the visiting entomologists were the guests of the Cambridge Entomological Club at a most enjoyable smoker held in Copley Hall.—J. CHESTER BRADLEY, Secretary-Treasurer.

STRAY NOTES ON GEOMETRIDÆ.

NO. I.—ON *PLAGODIS KEUTZINGARIA*, PACKARD.

BY GEO. W. TAYLOR, NANAIMO, B. C.

This name was published in Packard's Monograph, page 468, and attributed to Grote. The species was described from six males and one female, and is figured on plate xi, fig. 44, and plate xiii, fig. 51. The second figure was made from a specimen which seemed different from all the rest, being in fact a distinct species, afterwards separated as *P. nigrescaria*, Hulst.

The Monograph appeared early in June, 1876, and is reviewed in the July number of the CANADIAN ENTOMOLOGIST.

In the June number of the same journal is a note by Mr. Grote (page 12, Vol. VIII):

"*Eurymene Kuetzingi*, Grote

"A description and the type of this purple-black species have been sent February, 1910

to Prof. Packard for publication in his expected Monograph of the Geometræ. It is named for Mr. Kuetzing, of Montreal, who found the species."

In the August number of the CANADIAN ENTOMOLOGIST (VIII, p. 154), Mr. Grote protests against Packard having altered his manuscript specific name, but he himself in this place, perhaps by a printer's error, spells the name *Keutzingi* instead of *Kuetzingi*.

In 1882 Grote published his check list, and here we find he has fallen in with Packard's spelling, and the insect stands as *Plagodis Keutzingaria*.

In 1887 Hulst (Ent. Amer., II, 212) called attention to the fact that the two figures of Packard represent very different forms, and he proposed the varietal name *nigrescaria* for the dark form figured on plate xiii, fig. 51.

In 1896 Hulst published his "Classification," and therein lists *Plagodis Keutzingaria*, Packard, but in Dyar's list (1902) he writes *Plagodis Keutzingi*, Grote, having evidently come to the opinion that Grote's brief mention in CAN. ENT., VIII, 112, amounted to a *publication* of the species, and that it *antedated* the publication by Packard in his Monograph.

It should be noted that the Montreal collector whom Grote wished to honour was Mr. P. Kuetzing, but the specific names of the moth, except in Grote's first note, have always been written as though the gentleman's name was Keutzing.

In a paper published in May, 1907 (Ent. News, XVIII, 206). Mr. Pearsall discusses these species, and apparently assumes: 1st, that the note in CAN. ENT., VIII, 112, must be considered as a valid publication of a species *Eurymene Kuetzingi*, Grote. (Pearsall, by the way, misspells this name, as all the list-makers, including Grote himself, have done.)

2nd. That this publication antedated the publication in the Monograph of *Plagodis Keutzingaria*, Packard. On these two points no doubt Mr. Pearsall was misled by Hulst's nomenclature in Dyar's list.

3rd. That the particular specimen which Packard received from Grote (one out of seven) was the "variety" figured on plate xiii. He even goes so far as to suggest that Grote's protest (published in August, 1876) may have been the reason for the publication of this figure, thus showing that he has overlooked the fact that the Monograph was published before the protest was made.

Acting apparently on these assumptions, Mr. Pearsall adopts the name *Keutzingi*, Grote, for *nigrescaria*, Hulst, and claiming that

Keutzingaria, Packard, is thus preoccupied, he renames it *attruaria*, Pearsall.

But (1st) the mere mention of the fact that a specimen and description under a certain name had been sent to Packard for publication, does not constitute *Kuetzingi* anything more than a *nomen nudum*.*

(2nd) If it did, it cannot take precedence of *Keutzingaria*, because the Monograph, so far as I can learn, was published *before* the CANADIAN ENTOMOLOGIST for June came out. I am not absolutely sure of these dates, both were in June, 1876, but I have no doubt they can be definitely established.

(3rd) Grote evidently considered Packard's description and both figures as representing his species, otherwise there would have been no ground for protesting. He considered *Keutzingaria* and *Kuetzingi* as pure synonyms.

(4th) Grote, by adopting Packard's name in his list of 1882, shows that he did not look upon his note (CAN. ENT., VIII, 112) as having precedence over the Monograph.

(5th) Even if Mr. Pearsall is right in recognizing the name *Kuetzingi*, and in limiting it to the form *nigrescaria*, it seems to me that *Keutzingaria*, Packard, would be quite sufficiently different to be retained, and *attruaria* would still be unnecessary.

In my opinion, therefore, the names will stand as follows :

1876, *Plagodis Keutzingaria*, Packard.

1876, = *Eurymene Kuetzingi*, Grote, *nomen nudum*.

1907, = *Plagodis attruaria*, Pearsall.

1887, *Plagodis nigrescaria*, Hulst.

1907, = *Plagodis Kuetzingi*, Pearsall, non Grote.

The contention in the above argument is, that the name *Keutzingaria* in the Monograph was published *before* the name *Kuetzingi* appeared in the CANADIAN ENTOMOLOGIST, but that if this was not the case, *Kuetzingi* was never properly described, and is therefore only *nomen nudum*, abandoned by the author himself, and cannot now be used, so that in any case the name *Keutzingaria* must stand for one part of the species figured by Packard, and as Hulst was the first to note that two forms were mixed, clearly his name *nigrescaria* must also be retained.

* I notice that the editors of the Zoological Record for 1876, in listing the new species of Lepidoptera described during the year, have the entry : *Plagodis Keutzingaria* (Grote MS.), Packard, but pass over entirely Grote's *Kuetzingi*, although they elsewhere allude to his paper in the CANADIAN ENTOMOLOGIST.

NEW SPECIES OF NORTH AMERICAN DIPTERA.

BY D. W. COQUILLET, WASHINGTON, D. C.

Family Bombyliidæ.

Metacosmus manicipennis, new species.

Black, the face, an inverted Y-shaped mark beneath the oral opening, the stems of the halteres and middle of the knobs, white; the bases of the tarsi, apical portion of the front and middle tibiæ and extreme base of the hind femora, dull yellowish. Lower end of the front, the occiput and pleura, whitish pruinose. Abdomen polished, the narrow hind margin of segments 2 to 5 whitish pruinose. Wings hyaline, unusually tapering to the base, the axillary cell not wider than the anal cell at its narrowest part, the latter cell very broadly open at its apex, marginal cell greatly widened toward its apex. Length, 5 mm.

Glenside, Pennsylvania. A male specimen collected July 5, 1909, by Mr. C. T. Greene. Type No. 12764, U. S. National Museum.

Family Dolichopodidæ.

Dolichopus virga, new species.

Male: Near *pernix*, but the third joint of the front tarsi of the male less than one-half as long as the second, etc. Head green, face densely whitish pruinose, bristles on lower part of occiput whitish; antennæ wholly black, the third joint pointed, ovate, longer than broad, the arista subapical, tapering to the apex. Body green, the mesonotum and incisures of abdomen tinged with bronze; lamellæ of the hypopygium yellowish, the upper edge narrowly bordered with black. Hairs of the calypteres black. Coxæ black, the front ones, except at the base, yellow, their front side covered with short black hairs and with several black bristles toward their apices; femora and tibiæ yellow, a spot at apex of hind femora and the broad apex of the hind tibiæ black; tarsi black, the first two joints of the front ones and base of the first joint of the middle ones, yellow; femora not provided with long hairs, first two joints of front tarsi slender, the first nearly twice as long as the second, third joint less than one-half as long as the second, slightly widening outwardly, fourth joint dilated, scarcely longer than broad, fifth joint more dilated, about as long as the third, the first three joints with very short hairs, the remaining two fringed on each side; middle tarsi plain. Wings grayish hyaline, costa not thickened, fourth vein not broken, hind margin of wings evenly rounded. Length, 5 mm.

Female: Like the male, except that the front tarsi are similar to the middle ones in colour and structure.

Manahawkin, New Jersey. Two males and one female, collected Sept. 5, 1909, by Mr. H. S. Harbeck. Type No. 12765, U. S. National Museum.

Dolichopus dasypodus, new species.

Male: Near *plumipes*, but the first joint of the middle tarsi with scattered bristles only, not ciliate, etc. Head green, face yellow pruinose, bristles of occiput, except on the upper part, whitish; antennæ black, the first joint, except the upper edge, yellow, the second joint broader than long, arista tapering to the apex. Body green, mesonotum thinly gray pruinose, and marked with three indistinct bronze vittæ, pleura whitish pruinose, hypopygium black, the lamellæ subquadrate, white, bordered with black except basally. Front coxæ yellow, covered in front with short whitish hairs, and with many black ones along the inner side, a few black bristles toward the apex, middle and hind coxæ black, densely gray pruinose. Legs yellow, the front tarsi from apex of first joint and the middle and hind ones wholly black, apex of hind tibiæ brown; a single bristle on front side of the middle and hind femora before the apex, front and hind tibiæ subequal in length to the femora, the middle tibiæ about one-fifth longer than their femora; tarsi not dilated nor fringed, the joints becoming successively shorter, first joint of the middle tarsi enlarged and bearing several scattered bristles, apical third of the middle tibiæ whitish. Wings grayish hyaline, costa not distinctly thickened at apex of the first vein, the hind margin apparently strongly hollowed out at the apex of the third posterior cell (the wings are folded in the only specimen before me). Calypteres yellow, their hairs black. Length, slightly over 5 mm.

Female: Like the male, except that the first joint of the middle tarsi is not enlarged, its base is yellow and the bristles are few and mostly very short, hind margin of the wings evenly convex.

White Mountains, New Hampshire. A specimen of each sex collected by Mrs. Annie T. Slosson. Type No. 12766, U. S. National Museum.

Dolichopus luciniatus, new species.

Near *canaliculatus*, but the lamellæ of the hypopygium as broad as long, and very jagged at the apex, etc. Head green, the front violet-blue, face yellow pruinose, bristles of the occiput, except on the upper part, whitish; antennæ black, the under side of the first joint yellow, second joint broader than long, arista tapering to the apex; mouth-parts yellow. Body green, mesonotum thinly gray pruinose, pleura densely whitish

pruinose, hypopygium, except the basal segment, black, the lamellæ whitish, margined with black, except on the basal part of the under side. Coxæ yellow, the extreme base of the front ones partly and the middle and hind ones, except their apices, black, gray pruinose, front sides of the anterior ones covered with short black hairs. Legs yellow, the last joint of the front tarsi black, the middle and hind tarsi from the apex of the first joint brown; middle and hind femora with a single bristle before the middle of the front side, the hind ones fringed on the under side with long yellow hairs; front tibiæ subequal in length to the femora, the middle and hind ones slightly longer than their femora; front tarsi about one-third longer than their tibiæ, very slender except the last two joints, first joint twice as long as the third, the latter slightly shorter than the second, fourth joint laterally compressed, scarcely one-half as long as the third, fifth joint slightly longer than the fourth, laterally compressed and greatly widened, fringed with black hairs; joints of the other tarsi becoming successively shorter. Wings hyaline, costa distinctly thickened at apex of the first vein, fourth vein not broken, hind margin of the wing evenly convex. Calypteres yellow, the hairs black. Length, about 5 mm.

Roxborough, Pennsylvania. A male specimen collected June 7, 1908, by Mr. H. S. Harbeck. Type No. 12767, U. S. National Museum.

Family Scopeumidæ.

The synonyms of this name are: Scatomyzides, Fallen, 1810: Scatophaginæ, Desvoidy, 1830: Cordyluridæ, Macquart, 1835. Article 5 of the International Code of Zoological Nomenclature states that "The name of a family or subfamily is to be changed when the name of its type genus is changed." The type genus of the earliest name is *Scatomyza*, Fallen, 1810, equals *Scopeuma*, Meigen, 1800, hence the necessity for changing the name of this family.

Parallelomma setipes, new species.

Easily recognized by the colouring of the legs and the unusual number of bristles on them. Black, the front and the second joint of the antennæ yellowish-brown, the vibrissal swellings, oral cavity, palpi, apex of proboscis, halteres, tibiæ, tarsi, coxæ largely, the hind femora and apices of the others, yellow. Arista bare, strongly thickened at the base; antennæ slightly shorter than the face, the third joint about four times as long as the second, concave on its upper edge, the apex rounded. Face and front of nearly an equal width. Five pairs of dorsocentral bristles, the acrostichals arranged in two rows, extending almost across

the thorax. Body gray pruinose, thinnest on the mesonotum. Hind tibiae with three or four pairs of bristles on the outer side. Wings grayish, apical third of the first vein bristly. Length, 6 mm.

Castle Rock, Pennsylvania. Four male specimens, collected April 17, 1908, by Mr. H. S. Harbeck. Type No. 12768, U. S. National Museum.

Parallelomma flavovaria, new species.

Yellow, an ocellar spot, the thorax, except an interrupted vitta beginning on the humeri and extending above the wing, the scutellum, the first segment of the abdomen and bases of the other segments, broadest on the second segment and becoming successively narrower on each succeeding segment, black; on the second segment the black colour is prolonged backward in the middle, while on the remaining segments it is narrowest in the middle of the segments. Antennae nearly as long as the face, the third joint over three times as long as the second, rather broad, artist's bare, thickened on the basal third. Front over twice as wide as either eye. Body thinly gray pruinose. Wings hyaline, shaded with gray along the costa and the hind cross-vein. Venter black, the hind margin of the segments yellow. Hind tibiae bearing outwardly three or four pairs of bristles. Length, 5 mm.

Glenside, Pennsylvania. A female specimen collected April 21, 1907, by Mr. C. T. Green. Type No. 12769, U. S. National Museum.

Plethochæta atrifrons, new species.

Black, the halteres and legs, except bases of coxae, yellow. Antennae two-thirds as long as the face, the third joint oblong, less than twice as long as broad, rounded at the apex, arista pubescent, thickened on the basal third. Body gray pruinose. Front femora with several bristles and with a row of black spines on the under side of the median third. Wings yellowish hyaline, the veins yellow, bare. Length, 6 mm.

White Mts., New Hampshire. A male specimen collected by the late H. K. Morrison. Type No. 12770, U. S. National Museum.

Family Oscinidæ.

Chlorops (Diplotoxa) nigripes, new species.

Near *versicolor*, but readily distinguished by the black legs. Antennae black, the base of the third joint yellow, third joint ovate, about one and one-half times as long as wide, the lower side rounded, the upper nearly straight; arista white, the base yellow; head yellow, frontal triangle polished black, almost reaching lower end of the front, its sides nearly

straight: occiput black, the lower corners and a spot near upper corner of each eye, yellow; clypeus black, palpi yellow, proboscis black, the labella yellow. Body black, humeri ringed with dull yellowish, pleura reddish-brown, varied with black, a submedian yellow vitta; mesonotum opaque, toward the sides gray pruinose, appearing in certain lights as two irregular vittæ; scutellum slightly convex, abdomen polished. Knob of halteres whitish. Legs black, the coxæ, extreme bases of femora, the knees narrowly, and the tarsi, except the last joint, reddish-yellow. Wings grayish hyaline, small cross-vein about its own length from the small. Length, nearly 5 mm.

Trenton, New Jersey. Three specimens collected August 19, 1909, by Mr. H. S. Harbeck. Type No. 12771, U. S. National Museum.

Chlorops rufescens, new species.

Near *unicolor*, but differing in the white antennal arista, etc. Yellowish, the upper edge and apex of the third antennal joint, the palpi, an ocellar spot and a spot on lower part of the frontal triangle, black. Frontal triangle polished, not carinate, reaching the lower end of the front, the sides nearly straight on the upper four-fifths, on the remainder nearly parallel, the apex of the triangle bluntly rounded; front outside of the triangle covered with short black hairs. Third joint of antennæ orbicular, slightly broader than long. Mesonotum polished, marked with three reddish-yellow vittæ. Scutellum slightly convex. Wings hyaline, small cross-vein about twice the length of the hind cross-vein from the latter. Length, nearly 4 mm.

Delaware Co., Pennsylvania, July 23, 1893, C. W. Johnson; Pemberton, New Jersey, July 8, 1907, H. S. Harbeck; and District of Columbia, July 3, 1899. Four specimens. Type No. 12772, U. S. National Museum.

Chlorops subnigra, new species.

Near *confluens*, but the hind cross-vein more than twice its length from the small cross-vein, etc. Head yellow, the frontal triangle and occiput, except the narrow lateral and lower margins of the latter, black; frontal triangle polished, not punctured nor carinate, reaching the lower end of the front, the sides nearly straight, the apex pointed; antennæ black, the third joint orbicular, slightly broader than long, arista black; palpi yellow, clypeus with two black streaks. Thorax black, the front corners of the mesonotum and upper part of the pleura, except two large spots, yellow; mesonotum polished, not punctured. Scutellum yellow, margined with black, its upper side convex. Abdomen black, the sides

and venter largely yellow. Legs brown, the ends of the femora, of the hind tibiæ, and nearly the whole of the front and middle tibiæ, yellow. Halteres yellow. Wings hyaline, the second, third and fourth veins nearly straight. Length, slightly over 2 mm.

Manahawkin, New Jersey. A single specimen collected Sept. 5, 1909, by Mr. H. S. Harbeck. Type No. 12773, U. S. National Museum.

Ectecephala laticornis, new species.

Near *albistylum*, but with a much broader third antennal joint (in *albistylum* this joint is nearly three times as long as wide, narrowed on the apical part to less than one-half its width on the basal half). Head yellow, an ocellar dot, the upper edge of the third antennal joint, except basally, and the palpi, black; arista, except at base, white; frontal triangle reddish-brown, polished, prolonged to the lower end of the front, its sides concave until near the apex, then converging to the tip; third joint of antennæ oblong, scarcely twice as long as wide, concave on the upper edge, only slightly wider on the basal than on the apical half; front projecting in front of the eyes about two-thirds of the horizontal diameter of the latter; face, cheeks and lower half of the occiput whitish. Body reddish-brown, the pleura irregularly striped with light yellow, middle of the venter light yellow; mesonotum somewhat scabrous, and with a pair of gray pruinose subdorsal vittæ, a broader gray stripe in front of each wing; abdomen polished. Legs yellow, the front tarsi brown. Halteres yellow. Wings grayish hyaline, the second, third and fourth veins nearly straight, apex of the second vein over twice as far from the first as from the tip of the third, hind cross-vein twice its length from the small. Length, 5 mm.

Colorado, Georgia and North Carolina. Six specimens. Type No. 12774, U. S. National Museum.

Ectecephala sulcifrons, new species.

Near *laticornis*, but differing in the sulcate frontal triangle, black vittæ of the mesonotum, and the yellow front tarsi. Head yellow, an ocellar dot, a streak from each eye to the base of the antennæ, the upper edge of the third antennal joint, except basally, and the palpi, black; frontal triangle reddish-yellow, prolonged to the anterior edge of the front, its sides almost straight, the apex blunt-pointed, a median sulcus extending from the lowest ocellus to the lower edge of the front; antennæ as in *laticornis*; front projecting the horizontal diameter of the eyes in front of the latter. Thorax and scutellum yellow, tinged with flesh colour,

mesonotum opaque, gray pruinose, marked with three black vittæ, the lateral ones divided by a median line behind the transverse suture; pleura marked with about five black spots. Abdomen somewhat polished, the middle of each segment and a pair of vittæ on the venter, black. Legs yellow, the last tarsal joint black. Halteres yellow. Wings as in *laticornis*. Length, 5 mm.

Arkansas City and Kinsley, Kansas. Two specimens bred by G. I. Reeves and E. G. Kelly, of the grain-insect investigation of the U. S. Bureau of Entomology. Type No. 12775, U. S. National Museum.

THE LATE DR. BRODIE.

At a meeting of the Toronto Branch of the Entomological Society of Ontario, held on November 11th, the following resolution was adopted after several members had attested their appreciation of the service of their late President :

"That this Society desires to record its deep sorrow and keen sense of loss felt by every member in the death of the late President, Dr. William Brodie. The wonderful store of knowledge he had accumulated by years of active research and close communion with nature, was always open to every earnest seeker. He was willing at all times to help with inexhaustible patience, anyone seeking a key to nature's secrets. His time and the result of his wide experience were always at the disposal of the enquirer, and ignorance that must have seemed almost criminal in his eyes was always patiently enlightened. He attracted and inspired both old and young by rare endowments and attributes. He combined deep philosophic insight with careful accuracy of observation ; an open mind with strong opinions ; the wide knowledge of an omnivorous reader with unflagging enthusiasm and earnestness of purpose ; a broad appreciation of nature's charms through all the changing seasons, with a keen analytical spirit of research. He saw both the beauty and grandeur of the landscape and the marvel and mystery of a blade of grass. In practical work Dr. Brodie seemed to possess the rare quality of specializing in many lines. In entomology and especially in the field of parasitism and gall-production he added much to the world's knowledge. His entomological collections are a valuable heritage. He also led in many lines of investigation, in ornithology and other departments of zoology. In botany, too, he did much valuable work, both as collector and investigator. This resolution would be incomplete without a tribute to Dr. Brodie's full appreciation

of the world's best in art, in music and in literature, his kindly human sympathy and his earnest interest in the deeper problems of existence. This effort to express our appreciation will not seem fulsome to those to whom his worth has been revealed in close personal friendship and co-operative work. In expressing our own keen sense of a great loss, we desire also to extend our sympathy to those of his own household and the relatives who must still more deeply feel their heavy bereavement."

NOTES ON THE HABITS OF *DISOGMUS PUBESCENS*, KEIFFER.

BY G. E. SANDERS, URBANA, ILL.

On June 3, 1909, at Aurora, Ill., in following the plow in a timothy field heavily infested with the larvæ of a Carabid, *Amara carinata*, two were found to contain parasites, and on June 7th two adult ♀ *Disogmus pubescens* were obtained from them.

When taken, the *Disogmus* were both freshly-formed chrysalids, wholly bare, and attached by the posterior end to the larvæ from which they had emerged. In both cases the *Disogmus* larva had developed singly within the host larva, with its head end toward the hinder part of the *Amara* larva. The *Disogmus* larva emerges from its host, breaking through the ventral segments near the posterior end, until only the tip of the abdomen remains attached. The chrysalid is formed with its ventral surface toward the ventral surface of the host larva, the two being joined at the posterior ends to form a V. When taken at 9 a.m., June 3rd, the two Chrysalids were perfectly white, excepting the eyes, which were brown. At 5 p.m., June 3rd, the ocelli had turned brown, and the thorax in both was beginning to show a slight brownish tinge. On June 5th the head and thorax in both were black, the abdomen still white. On June 6th the abdomen was reddened slightly. On June 7th both adults emerged.

Regarding the development of the host, *Amara*: the chrysalids were formed from May 10th to May 14th, and the first adult emerged May 28th. An examination of the field on June 14th showed many adults present; only one chrysalid was found on this date.

On October 15th, 1908, one ♀ *Disogmus pubescens* was taken burrowing three inches down in a cornfield at Urbana, Illinois. This indicates that the species is probably two-brooded.

As it is improbable that more information on the life-history of *Disogmus* will be obtained soon, and hitherto none of the hosts of this genus have been recorded, these notes are given as a matter of record.

February, 1910

NOTES ON TENTHREDINOIDEA, WITH DESCRIPTIONS OF
NEW SPECIES.

BY S. A. ROHWER, BOULDER, COLO.

PAPER VIII.—NEW SPECIES FROM CALIFORNIA.

Loderus niger, n. sp.

Male: Length, 7.5 mm. Anterior margin of the clypeus deeply emarginate, the lobes broad and obtuse; the labrum rounded at the apex, punctured; the front rugoso-granular; behind the ocelli the head is shining and punctured; the lateral ocellar furrows distinct to the lateral ocelli, but not extending beyond them; the supraorbital fovea large and shallow, deeper at the orbits. Antennæ rather stout, somewhat flattened, the third joint very little longer than the fourth. The mesonotum and the scutellum shining, rather sparsely punctured, the punctures on the anterior lobe more compact; mesopleuræ anteriorly rugoso-punctured, posteriorly finely punctured; pectus shining, with a few scattered punctures. The basal abscissa of the cubitus strongly bowed downward, otherwise the venation is normal; stigma broadest at the base, tapering to the apex. Abdomen shining. Colour black; in some specimens there is a piceous spot at the apex of the anterior femora beneath. The head, thorax and legs with white hair. Wings dusky, hyaline, iridescent; venation black.

Female: The female differs from the male in being slightly larger, in having the wings paler, and the stigma more rounded beneath. The antennæ are not so flattened; the sheath is stout, the upper posterior angle is sharp.

Type locality: Mountains near Claremont, California. Males and females collected by C. F. Baker.

This is very distinct from *Loderus albifrons* (Nort.), the only other described *Loderus* known to occur in North America, by the entirely black colour. In general appearance it is like the group *sericeus* of *Dolerus*.

Prototaxonus, n. gen.—Clypeus distinctly emarginate; antennal joints three and four subequal; ocellar basin evident; the last two joints of the maxillary palpi subequal; malar space narrow but present; the third cubital cell broader below than above, due to the oblique transverse third cubitus; the second abscissa longer than the free part of M_1 ; the cross nervure of the lanceolate cell (free part of 2nd A) slightly oblique; cell

R_{1+2} of the hind wings appendiculate; two discal cells in the hind wing. Hind basitarsus shorter than the following joints united; the hind tibiæ longer than the femora and trochanters; claws with a short inner tooth.

Type, *Prototaxonus typicus*, Roh.

The following genera of *Emphytina* are closely related. They all have the hind basitarsus shorter than the following joints united, the first transverse cubitus is always present, the free part of M_1 is always shorter than the second abscissa of the cubitus, the cross-nervure of the lanceolate cell is straight or slightly oblique, the hind wing has two discal cells, and the lanceolate cell is sessile at the apex in the hind wing.

Tarsal claws simple (clypeus emarginate; cell R_{1+2} of the hind wings longly appendiculate)..... *Cockerellon*, MacG.

Tarsal claws with an inner tooth 1.

1. Clypeus emarginate; third transverse cubitus

oblique *Prototaxonus*, Roh.

Clypeus truncate; third transverse cubitus straight..... 2.

2. Cell R_{1+2} of the hind wings appendiculate; third cubital cell of the fore wings more than twice as long as the third transverse cubitus; apical and preceding joints of the maxillary palpi subequal; posterior tibiæ not longer than the femora and trochanter..... *Epitaxonus*, MacG.

Cell R_{1+2} of the hind wings not appendiculate; third cubital cell of the fore wings not twice as long as the third transverse cubitus; the apical joint of the maxillary palpi distinctly longer than the preceding; the posterior tibiæ distinctly longer than the femora and trochanter..... *Hemitaxonus*, Ashm.

Prototaxonus typicus, n. sp.—Female: Length, 7 mm. Head subopaque; eyes slightly converging to the clypeus; clypeus deeply emarginate, the lobes broad; lateral ocellar furrows very broad; the ocellar basin not closed below, uniting with the middle fovea; supraclypeal fovea deep, merging into the antennal fovea above; the apical antennal joint shorter than the preceding one. Mesonotum and scutellum shining and polished; sides of the scutellum with some large punctures; the mesopleuræ dulled by gray hairs. The transverse radial received in the extreme apex of the third cubital. The sheath broad slightly emarginate below, truncate, the upper angle very sharp; cerci robust, short, not

tapering. Colour black : clypeus, labrum, palpi, angles of the pronotum, tegulæ, a narrow band on all the apical abdominal segments and the middle of the venter *yellowish* or *orange colour*. Legs black ; tips of the coxæ, trochanters, apical half of the femora and the bases of the tibiæ *yellow*; the four anterior legs are brownish, not black. Wings hyaline, iridescent ; venation dark brown.

Male : Length, 6 to 7 mm. The male differs from the female in having the legs below the bases of the coxæ orange-colour ; the posterior tibiæ at the apex and sometimes above are infuscated. The transverse radial of the male is quite often interstitial with the third transverse cubitus.

Type locality : Mountains near Claremont, California. One female and six males collected by C. F. Baker.

Strongylogaster tibialis, Cresson, from Nevada, may belong to the genus *Prototaxonus*. *P. typicus* differs from Cresson's description of *S. tibialis* in the yellow clypeus and labrum.

Parataxonus lenis, Roh.—*Taxonus lenis*, Roh., Jn. N. Y. Ent. Soc., XVI, June, 1908, p. 110.

On re-examining the type of this species I find it belongs to the genus *Parataxonus*, MacG.

Cryptocampus Bakeri, n. sp.—Female : Length, 4.75 to 6 mm. Head seen from the side broadest above the antennæ, gradually narrowing to the occiput ; seen from the front the occiput rounds up above the orbits. Clypeus rather deeply emarginate, lobes rather broad, obtuse at the apex. Supraclypeal fovea merging into the antennal foveæ ; middle carina strong ; middle fovea deep, narrow, not closed above ; the ocellar basin not completely inclosed, the lateral walls the strongest ; lateral ocellar furrows broad, shallow ; intraocellar fovea wanting ; frontal crest not very strong, broken in the middle. The third and fourth antennal joints about equal, perhaps the third is a little the shorter ; the apical joint about the same length as the preceding, straight above, very slightly rounded out beneath, the apex acute. Head not very closely or strongly punctured ; scutellum shining, not nearly so closely punctured as the mesonotum. Venation of both wings normal ; stigma broadest near the base, gradually tapering to the apex ; claws deeply cleft, the inner tooth the shorter. Sheath straight above, gradually rounded from the rather sharp upper angle below ; cerci slender, somewhat tapering, as long as

the sheath; the sheath and cerci are clothed with rather long hairs. Colour black and ferruginous: antennæ black, somewhat pallid beneath apically: a spot from the ocelli to the occiput, and the back of the head, black; thorax above, pectus, lower part of the pleuræ. "posterior plate of the epimeron"? (Marl. N. Am. Nematinae). a spot in the middle of all of the abdominal segments above, the apex of the sheath, *black*; the tips of the tarsi and tibiæ somewhat dusky. Wings hyaline, iridescent: veins brown or pale brown, basal half of the stigma pallid.

Male: Length, 4.75 mm. The sculpture and shape of the head is much like the female: the clypeus is not so deeply notched, there is a more or less distinct sulcus from the anterior ocellus to the middle fovea, the antennæ are longer and covered with short hair, and the colour is somewhat darker. The procidentia is prominent and truncate at the apex; the hypopygidium is long and narrowed toward the apex. Colour black; all the orbits, clypeus, middle carina, tips of the pronotum, tegulæ, venter of the abdomen, and legs below the base of the coxæ *reddish-yellow*; apex of the posterior tibiæ and their tarsi black; antennæ a little paler beneath, at the apex. Wings hyaline, iridescent; venation and stigma brown, extreme base of the stigma pale.

Gall: Length, 12 to 20 mm.; width, 5 to 6 mm.; height, 4 to 4.5 mm.; a lateral swelling on the twig, never very abrupt, generally gradually tapering off at each end; when dry, roughened longitudinally; always monothalamous: adult leaving the gall from an opening in the side; bark of the twig when dry reddish-brown; occurs on *Salix* sp.

Var. A — Two females have the stigma pale brown, and most of the pleuræ black, and the head is coloured like the male.

Type locality: Claremont, California. Many males and females bred from galls, and a few specimens collected by C. F. Baker.

This species is near *hebbiana*, Roh., but it differs from that species as follows: Female: Occiput rounded above the eyes: middle fovea elongate; a spot on the pleuræ pale, and the apical antennal joint is more acute at the apex. Male: The occiput is more strongly rounded above the eyes: the middle fovea is deep elongate: the frontal crest is not nearly as prominent; the apical antennal joint is more obtuse at the apex: the procidentia is narrower, longer and more prominent. The gall is not as abrupt as the gall of *hebbiana*, and undoubtedly occurs on a different species of *Salix*.

FURTHER NOTES ON PACHYBRACHYS.

BY FRED. C. BOWDITCH, BROOKLINE, MASS.

Among the Mexican material of the late Mr. Jacoby is a specimen from Ventanas, Durango, labelled *P. Ventanensis*, Jac. I find no description under this name, and it seems to be the form described as *Durangoensis*, Jac. It comes very close to one of the forms I have called *Snowi*, but in the absence of further Mexican material I can only draw attention to it.

In the Snow collections is a ♀ specimen from the Santa Rita Mountains, Arizona, which I placed provisionally as *longulus*, Suff. There is no example of this species among my Mexican material, and further specimens are needed to fully determine its identity. The form is broad, long and cylindrical, flattened above and rather coarsely punctured; of the same form as *punctatissimus*, Jac., with narrow, wide thorax. It is the largest species in North America, measuring 6 mm. in length and 3 mm. in breadth.

In the second Jacoby collection under the name *oculatus*, Suff., is a single ♂ of the form named by me, *Texanus*, CAN. ENT., 1909, p. 316. What purported to be the type of *oculatus*, Suff., was lent to me by Prof. Taschenburg from the Halle Museum. It did not agree with the description of *oculatus*, and seemed to me to be a specimen of *pectoralis*, Mels., and I have seen nothing which appears to me to fit the description of *oculatus*. Specimens taken at Wellfleet, Massachusetts, by Messrs. Frost and Bolster, I was at first inclined to regard as the true *oculatus*, Suff., but finally put them with *pectoralis*, Mels. The Eastern Coast States is the locality given for *oculatus*, Suff.

The following forms seem to merit recognition :

P. notatus, nov. sp.—Large sized, stout, dull black and bright yellow, thorax with three prominent yellow spots on top, elytra fairly regularly striate, punctate. Length, $3\frac{1}{2}$ mm.

Head yellow, flat, with black vertex. connected with center line, which runs into a crescent mark which ends at the antennæ on either side, black marks thickly punctate, clypeal edge also black, sparingly whitish pubescent, especially in the angles of the eyes, which are distant; antennæ dark, lighter towards the base, reaching the hind coxa in ♂; thorax constricted in front and narrowed behind, yellow, with very narrow beading on front margin black, the surface covered by a broad black M, which occupies nearly the whole rear margin and leaves a lateral and anterior

border of yellow, the former being the widest ; there is also a pear-shaped yellow spot placed obliquely and pointing to the scutel on either side of the disk at the rear, dilated end to the front and an anterior median spot, which joins the yellow margin, also a small yellow dot on each side ; surface with sparse punctures, closer toward the anterior corners, the yellow margins, except as aforesaid, are about free from punctures, lateral edge very slightly subangulate in ♂ ; elytra parallel, slightly compressed behind the shoulders, yellow, with suture and margin narrowly black ; the inside standard spots suffused longitudinally into an irregular black mark joining a transverse band on the convexity formed by the suffusion of the four rear spots, the external middle spot is not suffused, the humeral spot is also distinct, the punctuation is a little coarser than the thorax, largely confused, but the intervals from the third outwards on the rear half of the elytra are more or less distinctly indicated, though the costæ are everywhere flat, the third and fourth and the marginal and next to it are the most marked intervals, there is also a prominent smooth yellow sutural shield and another patch occupying three or four intervals and forming a transverse spot on the side just before the convexity ; marginal stria barely sinuate behind the lobe, which is wide and smooth, with a fine row of marginal punctures ; under side black, with silvery pubescence, prosternum semisulcate ; legs yellow, with spots on thighs, and tibiæ and tarsi darker ; hind thighs with a white spot on end, and front thighs with light spot on front.

One ♂, Santa Rita Mts., Ariz. Collected by the late Prof. Snow. In form, size and general appearance very similar to *inclusus*, Jac. Type in Snow collections.

P. trivittata, nov. sp.—Medium sized, yellow above, regularly punctate striate, with heavy black thoracic M and three elytral stripes not reaching the apex, the middle stripe sutural. Length, $2\frac{1}{2}$ –3 mm.

Form rather short and stocky, head yellow, with very heavy black frontal and vertex marks ; antennæ black, slightly tinged with brown at the base, reaching about the middle of the abdomen in ♂, frontal face flat and thickly punctate, eyes very distant, especially in the ♀, thorax broader than long, narrowed towards the front, evenly and moderately punctured on the dark parts, sparsely elsewhere, colour light yellow, with heavy black M, sides broadly, roundly subangulate, a little in front of the middle, elytra of the same width as the thorax, yellow, regularly punctate striate, the third interval complete, like *balsas* and *pallidipennis* ; each

elytron has the suture and a discoidal vitta black, the former connecting with the middle of the thoracic M and ending just over the convexity (the two elytra together showing a single sutural vitta of the same width as the discoidal), the latter begins back of the inflexed edge on the third and fourth intervals and runs back to the edge of the convexity, at which point it switches to the side, and, with a curve, connects with the posterior standard exterior spot, the middle and anterior standard exterior spots are also marked in black, the humeral the stronger, marginal stria lightly curved, with the lobe strongly developed and a thick row of marginal punctures, body beneath black, the last one or two segments and the pygidium picked out with yellow, legs black with spots on the femora and tibiæ, making yellow knees; the anterior coxæ are also yellow in the ♀, the anal fossa is broad and shallow.

This species belongs to the *othonus* group.

Twelve examples, Cuernavaca, P. de Ixtla, Mexico. Collected by Mr. Wickham. Type coll., Bowditch.

P. Carolinensis, nov. sp.—Of the size and general facies of *bajulus*, Suff., only much more regularly punctate striate: colour dirty-yellow, with the standard spots more or less suffused. Length, 2–2½ mm.

Head yellow, with the usual dark, median and vertex spots, which are thickly punctured; the extent of the colour varies much, and specimens occur where the yellow is much reduced, front slightly convex, eyes distant in both sexes; antennæ yellowish or brown, reaching the middle of abdomen in ♂, much shorter in ♀; thorax broader than long, narrowed in front, subangulately rounded at the sides about the middle, colour yellow, with the M more or less distinctly indicated, but usually by partially disconnected patches, punctures rather fine and mostly confined to the dark areas, scutellum narrowed at rear and black; elytra yellow, with almost regular striæ of rather coarse black punctures: the best developed examples show only a slight confusion of the punctures in the scutellar area, and a very slight break or slip back of the humerus, at or about the area of the middle exterior standard spot; these specimens also show a well-marked triangular shield; the standard spots are all more or less visible, and run together in ill-defined areas, and the suture and margin are narrowly black, the marginal stria is very lightly curved, with a well-developed lobe; body beneath black, with the sides of the abdomen and pygidium picked out with yellow; legs brown, yellow or whitish, with darker rings on the femora, knees and tibiæ; anal fossa shallow.

The species is less narrowed than *femoratus* O., and much more regularly striate.

Twenty-two examples, Southern Pines, N. C. Collected by Mr. A. H. Monee. Type coll., Bowditch.

P. Shasta, nov. sp.—Size rather large, colour testaceous, tintured with reddish-brown, not infrequently with the standard spots on the elytra, which are coarsely punctate. Length, $3-3\frac{1}{2}$ mm.

Head flat, testaceous, with dark impressed vertical line joining a dark spot on the vertex and also at bases of antennæ, which are testaceous at base, growing darker after the fourth joint and reaching about the middle of the body (♀), eyes distant, thorax testaceous, broader than long, moderately punctate, strongly, tubularly narrowed in front and with a well-marked rear depression; M indicated by brown clouds, which vary much in density, the ends of the arms being, as usual, in the ends of the transverse depression, lateral edge angulate and sinuate at rear; scutellum prominent and truncate, elytra testaceous, with diffuse usually brown punctures, which towards the rear and sides are arranged in rows, making regular but flat intervals, standard spots showing to a greater or less extent, in one example the rear spots are suffused into a rough band and join the middle interior spot, in another ♀ all the spots show except the middle ones, so that it appears as four black spots on the back, and in others the spots are only faintly indicated, marginal stria very feebly curved and strongly sinuate behind, lobe well developed, very feebly punctured, below usually dark, with the epimera, sides of abdomen and last segment and pygidium light. This last has dark spots on each side and middle, the fossa of ♀ is also dark, legs testaceous, with more or less clouds; some examples are much lighter coloured below. The form is broad, not narrowed behind, but constricted in front.

Most of the specimens I have seen were in the collection of Mons. Clavareau, of Brussels, and collected by Dr. Fenyès at Castle Crag, California. Type No. Calif. coll., Bowditch.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Treasurer desires to call the attention of members, and subscribers to the CANADIAN ENTOMOLOGIST, to the fact that the annual dues of one dollar were payable last month. All those who have not yet sent in their subscriptions are kindly requested to do so at their earliest convenience. Remittances should be made by post-office or express orders, which only cost two cents, and not by bank cheques, which cannot be cashed for less than fifteen cents as a rule, and sometimes even more. Orders should be made payable to *The Entomological Society of Ontario, Guelph, Can.*

DESCRIPTIONS OF THREE NEW SPECIES OF EUPITHECIA
FROM WESTERN AMERICA.

BY GEO. W. TAYLOR, NANAIMO, B. C.

Eupithecia Lagganata, n. sp.—Expanse, 22 mm.

Palpi short and stout. Head, thorax and fore wings dark gray, with a brownish tinge. Abdomen and hind wings paler, the first segment and the last two segments of the abdomen whitish.

Fore wings very long and narrow, pointed at apex, tornos rounded. The wings are crossed by numerous alternate pale and dark lines, the dark lines being emphasized on the costa, and the paler ones on the hind margin. There are about four of the pale lines between the base of the wing and the intradiscal line, two in the median space and three beyond the extradiscal line, in addition to the wavy submarginal.

The median area is limited outwardly by a dark shade, which follows an unusual course; it is directed inwardly from the costa to the subcostal vein, then curves outwardly to vein two, and then with a similar curve to inner margin, which it meets three fourths out from base: there is a long black dash on the median vein, and another on vein two.

The lines on the fore wing seem to be continued across the hind wing, but are only evident on its inner margin, except the fine wavy, white submarginal line, which can be traced completely across the wing. The central portion of the hind wing is quite without markings.

Beneath the fore wing is very lightly scaled; there are three dark spots on the costa, alternating with three pale spots, the central dark spot being exactly above the discal spot. There is a fourth dark spot on the costa, near the base, and a fifth near the apex. Submarginal space slightly darker, with the pale submarginal line faintly indicated.

Hind wing more heavily scaled, gray, crossed by about five brown lines complete across wing, the first and third extradiscal being heavy and diffuse; discal points brown, minute.

This species bears a slight superficial resemblance to the European *E. nanata*, but has much narrower wings, and a different arrangement of lines.

The type specimen, a male, is unique at present, and was captured by my good friend, Mr. F. H. Wolley Dod, above Agnes Lake, near Laggan, Alberta, at an altitude of 7,200 feet. It is dated 17 VIII, '07. The captor has very generously left it in my collection.

February, 1910

Eupithecia compactata, n. sp.—Expanse, 24 mm.

Palpi short and stout. Upper surface wholly dark gray.

Fore wing rather long and narrow; four or five wavy lines in the basal area; intradiscal dark and heavy on the costa, running out at a right angle to the costa as far as the cell, then in a fine wavy line to inner margin. Median space darker except for a pale cloud which precedes the linear black discal spot; a very faint median line includes the discal spot, and a second similar line, between it and the extradiscal, is parallel to the first.

The discal space is bounded outwardly by a double pale line, which makes a rather sharp angle opposite the discal, and runs thence in an almost straight line to the inner margin, being subparallel to the outer margin. Submarginal space the same shade as the median. It is bisected by a conspicuous wavy white line, which terminates in a large V on vein 2.

Hind wing same colour as fore wing, clear of markings, except traces of lines on the inner margin, and a very faint discal point. Marginal broken line on all wings. Fringes long, spotted.

Beneath, fore wing lightly scaled, smoky; lines on the upper side indicated by dark spots on the costa: submarginal line and discal spot faintly reflected.

Hind wing gray, with a faint discal point, and a basal and two extradiscal brown lines marked by dashes on the veins.

The under side of this species bears a close resemblance to that of *E. Lagganata*, described in this paper, but on the upper surfaces the two insects seem sufficiently distinct. The type is a single female taken at Windermere, Upper Columbia River, British Columbia, by Mr. F. H. Wolley Dod, on the 13 VII, '07, and generously given to me.

I have lately seen a specimen taken by Mr. C. H. Young at Euchulet, on the west coast of Vancouver Island (16 VII, '09), which looks rather like *E. compactata*, but I cannot be quite sure of its being conspecific.

Eupithecia Spaldingi, n. sp.—Expanse, 21 mm.

This is a rather obscurely marked species, but it is possible that if my type specimen was in better condition the markings would appear more definite.

The whole upper surface of the wings is gray, overlaid with scattered black scales.

All the margins of the wings are very straight, and the fore wings are narrow and pointed.

The basal area (of fore wing) is pale, no definite lines can be made out. The median band is darker than the rest of the wing, and its intra- and extradiscal bounds are almost parallel to each other. Each of these lines runs from the costa, at a sharp angle, to the median vein, then turning inwardly at right angles to its former course, runs in an almost straight line to vein 1, and thence curves inwardly to inner margin.

There is a white, wavy, submarginal line, rather nearer than usual to the margin of the wing, and accompanied on each side by a dark shade. There is a conspicuous black discal spot on the median band, and though no lines can be traced in the band itself, there are the beginnings of two such lines indicated on the costa.

The clear, conspicuous median band is characteristic of this species, and will enable it to be easily recognized.

Type, 1 female, Stockton, Utah, 2 IX, '03, taken by Mr. Thomas Spalding, after whom I name the species.

I owe the specimen to the kindness of Prof. H. F. Wickham.

A NEW DIPTEROUS PARASITE OF BATS.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

At the Great Sphinx Mine, south of Crisman, Boulder County, Colorado, alt. 7,000 ft., on Nov. 1, 1909, Mr. John J. Blanchard obtained a bat of the species *Corynorhinus macrotis* (subsp. *pallescens*, Miller), which he kindly transmitted to the Museum of the University of Colorado. Upon it were two specimens of the curious Streblid genus *Trichobius*, male and female. I thought at first that they were *T. major*, Coquillett, which they resemble in their relatively large size, but comparison with Mr. C. T. Brues's excellent description and figures in Bull. Amer. Mus. Nat. Hist., XX, 1904, pp. 131-134, shows that they represent a new species.

Trichobius corynorhini, n. sp.

♀.—Length a very little over 3 mm.; wing $3\frac{1}{2}$; head, thorax and legs clear, bright ferruginous, with golden-ferruginous hair; anterior median line on thorax rather obscure, and transverse suture not marked by a black line; abdomen above purplish-plumbeous toward the base, and whitish dorsally about the middle; halteres white; claws black; wings creamy-white, with pale ferruginous veins. The important characters separating this from *T. major* are: First cross-vein distinctly nearer base than apex of wing; third (between fifth and sixth longitudinal) cross-vein

conspicuously oblique: eyes with eleven ommatidia, three in the middle; hair on outer margin of hind femora much longer, fully as long as the width of the broad femur; hair at sides of apex of abdomen quite long (though much shorter than in the male); thorax not so broad.

♂.—Similar to the female, except in the characters mentioned by Brues. The eyes, however, have 14 ommatidia, four being in the middle. The antennae are pale yellowish, strongly contrasting with the deep reddish palpi. Head above beset with long bristles, which are not at all confined to a line, as in Brues's figure of *T. major*; bristle on end of palpus very long. The claws are unidentate, as in *T. major*; Townsend (Ent. News, 1891, p. 105) states that those of *T. Dugesii* are bidentate.

The insect has all the characters of *Trichobius*, as distinguished from *Strebla*.

A SYNTOMID MOTH IMPORTED WITH BANANAS.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

In the CANADIAN ENTOMOLOGIST, 1904, p. 204, Mr. Cockle reported the occurrence of a specimen of *Ceramidia Butleri* (Möschl.), in British Columbia, imported with bananas. A couple of weeks ago a specimen of *Ceramidia* was found in a grocery store in Boulder, Colorado, also among bananas. In all probability the larvæ live on the banana, and pupate among the fruit. On looking up the literature of *Ceramidia*, especially Hampson's revision in the British Museum Cat. Lep. Phalænæ, Vol. I, 1898, I found that the Boulder insect was indeed very close to *C. Butleri*, but apparently distinct. I accordingly wrote to Dr. Dyar for particulars concerning Mr. Cockle's specimen, which is in the U. S. National Museum; in reply he sent me the desired information, and in addition notes on several other related forms represented in the Museum. Dr. Dyar expresses the opinion that these different insects are good species, and advises me to describe mine. It is probable that the question whether we have to do with one polymorphic species, or several allied but distinct ones, can only be settled by breeding; but, in any event, the several forms are readily distinguishable, and deserve to be named.

Ceramidia (Butleri, var.?) musicola, n. sp.

1. Expanse about 37 mm.; structure, including antennae, venation, etc., as in *C. Butleri*, and with the first three ventral abdominal segments white, except the narrow hind margin of third and lateral hind margins of

second ; head, thorax and abdomen above strongly metallic, the head and thorax bluish, with the hair black, the abdomen yellowish-green, but bluish apically, the tuft dark steel-blue ; patagia with a white spot ; neck with an elongate crimson mark on each side ; front with a large transversely oval white spot ; orbits margined with white above and in front, broadly at sides of face ; the large anterior coxæ broadly white in front ; a large white spot on each side at base of abdomen ; anterior wings above a sub-metallic blue-black, the basal and apical field not at all differently coloured ; posterior wings with the upper half normally overlapped by the anterior wings, shining whitish ; beneath, anterior wings are white where they overlap the posterior, and are otherwise distinctly more metallic than above.

Among bananas at Boulder, Colorado, doubtless imported from Central America.

A similar, perhaps identical, insect, from Honduras, is in the National Museum, as I learn from Dr. Dyar. The specific name is from *Musa*, the banana.

The type will be sent to U. S. National Museum.

The *C. Butleri* group may be tabulated thus :

- | | |
|--|----------------------------|
| Neck with crimson spots..... | 1. |
| Neck without crimson spots..... | 3. |
| 1. Basal half of anterior wings shining green..... | <i>viridis</i> , Druce. |
| Basal half of anterior wings coloured like the rest..... | 2. |
| 2. Front with a large white spot..... | <i>musicola</i> , Ckll. |
| Front without a white spot (S. America)..... | <i>Butleri</i> , Möschl. |
| 3. Front with a white spot..... | British Columbia specimen. |
| Front without a white spot (Venezuela)..... | <i>caurensis</i> , Klages. |

Dr. Dyar reports that Mr. Cockle's specimen has the basal half of fore wings shining green, as Druce describes for *viridis*, but it has no red spots on the neck, while it has a white spot on the front. Thus it is near to *viridis*, but not the same.

The whole series affords a very good example of "Kaleidoscopic variation," with different combinations of the same unit characters. Whether or not these forms are fixed in nature, no doubt they could easily be obtained pure and constant by a breeder, following Mendelian methods.

HEMIPTERA. NEW AND OLD.—No. 3.

BY G. W. KIRKALDY, HONOLULU, HAWAIIAN ISLANDS.

Fam. Cimicidæ.

SAGRINA VITTATA, Spinola (— macropterous). = *Atelides centrolineatus*. Dallas (— brachypterous). Spinola described the long-winged form of this interesting Dinidorine in 1850; two years later Dallas described the short-winged form as *Atelides centrolineatus*, unaware of Spinola's work. Since then, so little has been known of the species, that Stal wrote (1867, O. V. A. F., XXIV, 522), "hemelytris alisque abbreviatis (an semper ?)." In the "Fauna of India," Rh., I, 288-9 (1902), Mr. Distant described and figured the long-winged form under Dallas's name (also querying Spinola's name), but omitted any mention of the other form. Pterygopolymorphism is so unusual in the Cimicidæ that a longer notice was merited.

Unfortunately, I do not possess specimens of the long-winged form, but as I have a pair of the short-winged form, from Upper Tong-kong (Rivière Claire), a few notes may be worth while.

These short-winged examples have a remarkable nymph-like appearance, particularly in the rather widely laminate lateral margins of the pronotum, although I suspect that these are not so thin as in the nymphs, and I do not know whether there is any difference in this between the two adult forms. My female agrees very well with Dallas's figure, except that in the latter the sutures of the tergites are not represented as sufficiently oblique laterally. The male is shorter in proportion, and the tegmina are a little longer, extending to the basal-most curve of the apical margin of the 4th tergite. The wings are exceedingly short, with greatly reduced venation. I hope to represent the male pygopher in a future communication.

MEGYMENUM DENTATUM, Boisduval. Papua, Fak-fak.

ASPONGOPUS VIDUATUS, var. *unicolor* (H. S.). Khartûm.

GONOPSIS PALLESCENS, Distant. S. India, Madura.

LYRAMORPHIA SOROR, Breddin. Papua, Fak-fak.

EUROSTES VALIDUS, Dallas. Tong-king. The parts mentioned by Dallas as black are dark green in the above (except the antennæ), and as violet are bright metallic-green.

TAMOLIA RAMIFERA (Walker). Horváth writes (1900, Termész. Füzet, XXIII, 365), that his redescription of this species is taken from an
February, 1910

immature ♀; I feel sure that Walker's original description was also from an immature specimen. The following seems to be the colouring of mature ones:

♂, ♀.—Above pitchy, with a bronzy gleam; a pale narrow line submarginally along the anterolateral margins of the pronotum. Tegmina piceous, the irregular cross-veins on the corium obscurely pale castaneous. Wings pale fuliginous. Tergites metallic greenish-violet, dorsopleurites indigo-blue, with a pale wedge across the middle of each segment (larger and clearer in the male than in the female). Beneath (with the legs, etc.), a sort of rather indefinite reddish-piceous, the sterna and abdominal spine mostly yellower. Antennæ pitchy black, apex of the last segment yellowish-brown. I have this from Papua, Fak-fak.

Fam. Coreidæ.

In my recent papers I have rightly substituted the family name "Myodochidæ" for the old "Lygæidæ," but at the same time I unfortunately transferred the latter to, and substituted it for, the "Coreidæ." *Coreus*, however, is anterior by a few pages to *Lygæus*, so that the name "Coreidæ" should be retained. Although several of my colleagues objected (on other grounds) to the change, no one pointed out where the real fault lay. I am very glad to be able, on the grounds of priority, to retain the well-known "Coreidæ," as the transference of the equally well-known name *Lygæidæ* was a great nuisance, although apparently necessitated. Now that name should pass away into the realms of synonymy.

Fam. Cercopidæ.

APHROPHORIAS, nom. nov., =|| *Lora*, Distant, 1908.

Fam. Tetigoniidæ.

MYSOLIS, Kirkaldy, 1904, = *Norsia*, Walker, 1869, = *Norsiana*, Distant, 1908. Mr. Distant has created an unnecessary new name.

IASSUS SINHALANUS, nom. nov., =|| *pulchella* (Kirby).

I, RAMA, nom. nov., =|| *elegans* (Distant).

TETIGONIA, Geoffroy, 1762.

In the "Fauna of India" (Rh. IV., 201, 1907), Mr. Distant regards as untenable my retention of the Geoffroyan name *Tetigonia*, and my rejection of Jacobi's *Tettigoniella*.

The thoroughness with which Mr. Distant has, with the assistance of Mr. Kirby, investigated this synonymy, is evidenced by his adoption of

the dates "1798-9" for Geoffroy's work, when I should have thought that the merest beginner would know that it was first published anonymously in 1762. It cannot be that Mr. Distant rejects the book on account of its anonymity, since he fully accepts the first volume of the Hope Catalogue of Hemiptera. But even if so, the matter is not complicated, as a re-issue was made in 1764 under Geoffroy's name, and a summary, with proper specific names, appeared in 1785. I must therefore insist on dealing with the original issue of 1762 (or if Mr. Distant prefers, with that of 1764), and not with the much later edition cited by Mr. Distant.

Under "*Cicada*" Geoffroy first of all describes 25 species, not one of them belonging to the Cicadidæ, in a modern sense. On p. 429 he observes that one could reserve for the big Cicadas the name of *Cicada*, and call the little ones *Tetigonia*, a name given to them by many authors, *Procigales* in French, as indeed Réaumur has called them. He then proceeds to give differential characters for the two. Again, on p. 412, he says that the Cicadas of his country were called by several authors *Procigales*, to distinguish them from the true Cicadas. He also describes two of the true sort.

Mr. Distant contends, first of all, that Geoffroy's *Tetigonia* was only a misprint for the Linnean *Tettigonia*, of the Orthoptera. Geoffroy never once alludes to the Linnean *Tettigonia*, and renders his own genus *Tetigonia* each of the two times he mentions it by name. It is spelt also this way in the editions of 1764 and 1785, and presumably in the later one. It is therefore no misprint, and it is ridiculous to suppose that Geoffroy, who had a much clearer idea of entomological taxonomy than Linneus had, could confuse the Hemipterous Cicadid with the Orthopterous Tettigoniid. In those days the rule of priority was as little respected as it is by Mr. Distant to day, and Geoffroy probably disregarded Linneus's division *Tettigonia* of *Gryllus* (deeming, as was the case with the ancient Greeks, *Tetigonia* to be a Hemipterous name), as Fabricius did the division *Ranatra* of Linneus, when he wanted to found a Heteropterous genus.

One of the most commonly accepted rules of Nomenclature is that two generic names are valid even if differing only by a single letter. Mr. Distant would accept, I suppose, such words as *Bala* and *Balla*; therefore, as Geoffroy does not mention Linneus, the modern author ought to accept *Tetigonia* and *Tettigonia*.

I cannot admit that the reference to Réaumur (a prelinnean author) can fix the type of *Tetigonia* for the species mentioned by him. The same

thing has been attempted for *Chermes*, to make it a Coccid genus, but, as I believe, invalidly.

With regard to *Cicadella*, I am unable now to refer again to Latreille's work of 1817. In a later edition, the "*Cicadæ ranatræ*" are given as a synonym, but not exclusively, as is evident from the context; the genus is divided into several subgenera, and the LAST one is called *Tettigonia*, being said to contain the *Cicadellas* proper. If, therefore, *Tetigonia* (or *Tettigonia*) is the typical subgenus of *Cicadella*, then *Cicadella* is a strict synonym of the earlier *Tetigonia*. Of course, if this information is not in the 1817 edition, then one of the "*Ranatræ*" of Linneus, 1767, must be taken, and I must abandon my present contention (as regards *Cicadella*).

Fam. Asiracidæ.

Delphax pictifrons, Stal, 1864, Stett. E. Z., XXV, 50, Mexico.—This has been omitted by Fowler in the *Biologia*. I do not know it.

BOOK NOTICE.

GENERA INSECTORUM COLEOPTERA ADEPHAGA, FAM. CARABIDÆ, SUBFAM. CICINDELINÆ. Von Dr. Walther Horn, Wytsman, Bruxelles, 1908.

"One hundred and fifty years have flown since the publication of Linné's tenth edition of the '*Systema Naturæ*,' in which the Swedish naturalist cites five species of the genus *Cicindela*. He calls them '*Tigrides veloces*,' and the name 'Tiger Beetles' has persisted until to-day, when about forty genera, with twelve hundred species and a few hundred subspecies, are known."

These, freely translated, are the introductory words of Dr. Horn's paper, and give some idea of the development of the knowledge of this group. Seldom do we meet with an entomological treatise in which the author displays such familiarity with the literature of his subject, together with knowledge of the specimens themselves, in cabinet and in nature. The amount of information conveyed is astonishing, and the work is really far more than its title indicates. It is arranged in two sections, a "General Part" devoted to a discussion of the problems encountered in a study of the group, and a "Special Part," containing tribal and generic synopses with systematic list of all the species, accompanied by bibliographic, synonymic and geographic references. In the space available it is possible only to note the general plan of the work and to cite some points of interest to American entomologists.

Dr. Horn believes that the *Cicindelinae* have been more thoroughly collected than almost any other group of beetles, and estimates that the number of species still unknown does not exceed twenty or twenty-five per cent. of those now described. The Palearctic region has long since been about exhausted, new species are scarcely to be expected from North America, while Mexico, Central America, western South America, South Africa, as well as most of the islands of the Pacific, Indian and Atlantic Oceans have nearly ceased to yield novelties. The majority of new things must come from China, India, the Philippines, Dutch Borneo, New Guinea, tropical Africa and Australia, Madagascar and Brazil. In this connection it must not be forgotten that the author's conception of a species does not coincide with that of some descriptive entomologists, and forms which appear to be more or less worthy of names will undoubtedly still come to hand in numbers.

The tiger beetles are regarded as forming a subfamily of Carabidae, under the name *Cicindelinae*—a reduction in rank, which seems undoubtedly warranted in view of the evidence presented. After a sketch of the history of their classification, the author presents the arrangement developed by his own researches, separating them into two great phyla, according to the structure of the metepisterna; these divide again into five tribes, with several minor groups, as follows:

- | | | | | |
|-------------------------|--------------------------------------|-------------------|-----------------|----|
| A. Alakosternal phylum. | { I. Ctenostomini.
II. Collyrini. | | | |
| | | | | |
| | { III. Cicindelini. | 1. Theratina. | 2. Prothymina. | 3. |
| | | Odontochilina. | 4. Cicindelina. | 5. |
| | | Dromicina. | | |
| | | | | |
| B. Platysternal phylum. | { IV. Megacephalini. | 1. Megacephalina. | 2. Omina. | 3. |
| | | Platychilina. | | |
| | | | | |
| | { V. Mantichorini. | | | |

Of these, only III and IV are represented in North America by the *Cicindelina*, *Megacephalina* and *Omina*—our genera being *Cicindela* (including *Dromochorus*), *Megacephala* (*Tetracha*), *Omus* and *Amblychila*.

A considerable portion of the volume is devoted to morphological discussions, illustrated by three well-executed plates. These abound in comparative notes, and are of great value in throwing light on the phylogeny of the groups, since the palæontological record is nearly blank. Chapters are given to the sternal structure, the coxal articulations, the abdomen, the elytral epipleuræ, the hind wings, the elytral markings (this last with over a hundred text figures, showing the development and modifications of the colour pattern), and the vestiture. From the study of the markings the conclusions are drawn that identity of pattern is by no means always indicative of close relationship, although related species have usually similar markings, and that longitudinal marks in the Cicindelinæ are secondary rather than primary developments.

The chapter relating to geographical distribution and zoögeography is full of interesting details and conclusions. The number of genera and species increases as the equator is approached — this may be seen readily by reference to the illustrative plate. Besides a very considerable portion of the colder boreal and austral lands, a great part of the Pacific island area is without Cicindelinæ. The genus *Cicindela* has the widest range, *Megacephala* (including *Tetracha*) coming next. Some of the species of both of the above genera have extremely wide range, others show remarkable cases of discontinuous distribution. Only two genera are Palæarctic, four Nearctic. The Neogæic (South American) region is very rich in generic types, eighteen being found there, of which two extend to the West Indies. The Ethiopian region is believed to be the original home of the ancestral Cicindelinæ of both phyla, and contains representatives of most of the modern groups. The Oriental region yields ten genera, and the same number is known to inhabit the Notogæic region, *i.e.*, the Austro-Papuan-Polynesian district.

The phylogeny of the tribes of Cicindelinæ and of the principal types of the genus *Cicindela* is worked out and illustrated by two plates. From a study of relationships, the author reaches the conclusion that the Cicindelinæ form a branch of the family Carabidæ, coordinate with the Carabinæ as a whole. Between the most primitivite genuine Cicindelinæ and the corresponding Carabinæ on the one hand and their common Cicindelid-Carabid ancestor, a number of coördinate intermediate forms have been given off, two of which may be identified with the recent phyla of Cicindelinæ.

That portion of the "Special Part" which has come from the printer is concerned with the Ctenostomini and the Collyrini. The former tribe

comprises two genera, *Fogonostoma*, with 32 species, all from Madagascar and the outlying islands, and *Ctenostoma*, with 45 species, from South and Central America, one extending into Mexico. The second tribe is divided between the genera *Tricondyla* (*Tricondyla*, s. str., and *Derocrania*), which contains 27 species, with numerous subspecies, and *Collyris* (subgenera *Archicollyris* and *Neocollyris*), listing 65 species. Both of these genera are Oriental. The remainder of the work is promised soon.—H. F. WICKHAM.

GEOMETRID NOTES—A NEW VARIETY.

BY L. W. SWETT, BOSTON, MASS.

Mesoleuca implicata, var. *Williamsi*, n. var.

Expanse, 21–24 mm. Palpi short and dark, front of head dark, with mark between antennæ, as in *implicata*, Gn.; thorax and abdomen dark olive-brown. Fore wings olive-brown, with no traces of light ash as in *implicata*, the narrow band enclosing distal dot very dark olive, border of wings dark olive-brown. Otherwise the course of lines and their number are the same as in *implicata*. Hind wings dark, with 7 or 8 dark smoky bands (not discernible in all specimens). Beneath two faint curved extradiscal lines and one broad marginal, with venular dots on fore wings. Hind wings with two broad extradiscal dark bands and heavy dots at base of intervenular dots of fringe.

This variety is evidently a second brood of *implicata*, and differs from the latter in the dark olive-brown fore wings with band enclosing discal dot of the same colour, where in *implicata* it is light ash, as is also the border of the wing, which is dark in *Williamsi*. The body of *Williamsi* is dark, and the dorsal spots more diffuse than in *implicata*, which has lighter hind wings and lacks the heavy dark wavy bands with dark fringe. Beneath the difference is less striking, except in the type, which is more heavily marked on the hind wings.

This is quite a striking variety, and I find nothing like it in Packard's series from Cal., Nev. and B. C. I take pleasure in naming it after Mr. F. X. Williams, from whom I received it.

San Francisco, Cal., type 1 ♀, Oct. 5, 1909; co-types 2 ♀'s, Oct. 5 and 10, 1909.

Cidaria multilineata, Pack. (Proc. Bost. Soc., N. H., 1870, May 4, p. 403), is a synonym of *implicata*, with specimens of which I have compared the type.

Mailed February 8th, 1910.



FIG. 1



FIG. 6



FIG. 2

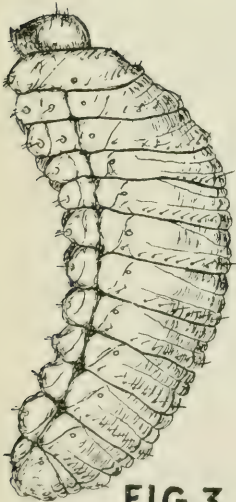


FIG. 3

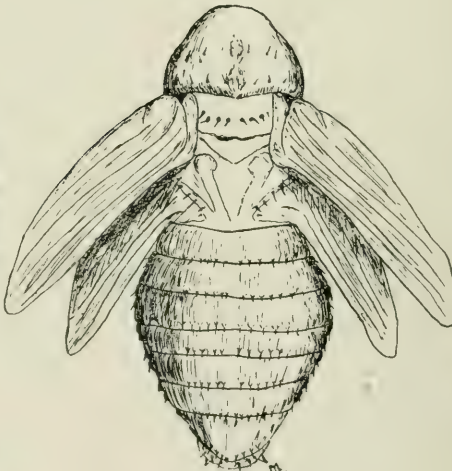


FIG. 4



FIG. 5

LIXUS MARGINATUS, SAY.

The Canadian Entomologist.

VOL. XLII.

LONDON, MARCH, 1910.

No. 3.

NOTES ON *LIXUS MARGINATUS* SAY.

BY MERRILL A. YOTHERS, E. LANSING, MICH.

While collecting under a fence at the Michigan Agricultural College on the 4th of September, 1909, I noticed a great many swellings, about as large as peas, on the stems of the low, flat shore weed, *Polygonum littorale*. Upon opening these, I found that they were galls, containing a snout beetle or its larva or pupa. Many of the beetles had already emerged from their galls, in which there was always a hole in the apex or anterior end of the gall.

Every beetle found was lying snugly in his or her nest, with head toward the terminal end of the twig.

A great many larvæ and pupæ were found. At least one twig was found which contained a larva, a pupa, an adult, and the empty galls from which adults had emerged.

The galls were generally scattered along the stems of the larger, healthier plants. Some were close to the base of the plants, and some were only a couple of inches from the tips, but more were found about half the distance between bases and tips. The galls near the tips being necessarily small contained the very young larvæ, while the larger galls near the base contained the pupæ, large larvæ, and adult beetles.

The beetles and galls were found only in the larger, healthier plants growing in protected places. None could be found on plants in such places as lanes, lawns and pastures, though luxuriant growths of the plant were found in such places.

At the time of first finding this insect (Sept. 4), I collected several adults, a couple of larvæ and a pupa. One of the larvæ was nearly full-grown, the other was not more than half-grown. Some of the beetles were just matured, others were quite ready to emerge, as some had already done.

On October 6th I collected several more adults, larvæ and pupæ. On this date I found some very small larvæ, as well as other sizes.

The life-history of this species is not entirely known, so far as I have been able to learn. The eggs must be laid just beneath the bark of the

plant or inserted into the pith. The season for egg-laying must of necessity be quite long, as both very young larvæ and emerged adults were found on September 4th and October 6th. Besides these stages, half-grown larvæ, mature larvæ and pupæ were found on both dates. Whether the latest adults to mature live over winter in the galls and do the egg-laying the next year I do not know. It may be that the larvæ or pupæ, or both, remain in the galls over winter and mature the succeeding spring; or the adult beetles that emerge in the fall may hibernate in protected places and regain activity in the spring and lay eggs for the succeeding generation.

A great number of the larvæ had been parasitized, as was shown by the absence of the larvæ and the presence of small holes in the galls through which the parasites had emerged. One of these parasites, a Braconid, was taken alive from a gall.

A fungous disease was also found in several galls. The larvæ were in these cases black, and covered with the fungous growth.

I quote from Say the original description of this species:

"Black, covered with minute, cinereous hairs, thorax impressed. Inhabits Central States. Body black, covered with short, minute, robust, recurved hairs, punctured. Antennæ rufous, club dusky. Thorax a little convex on each side, behind the middle of side rectilinear; a little contracted before, with an indented line above, more profound near the base, with dilated, confluent, slightly impressed punctures, not deeply sinuate at base, with regular series of punctures. Elytra, region of the scutellum indented; abdomen dull fulvous behind; length nearly seven-twentieths of an inch."

LeConte, in his Catalogue of Rhyncophora of North America, makes the follow comment: "This species is said to occur on the Lower Mississippi and in the Atlantic States. I have not identified it, nor was it known to Gyllenhal, who merely cites Say."

Dr. E. A. Schwarz, who kindly determined my specimens, said: "*Lixus sylvius*, Boh., is a synonym for *L. marginatus*, Say, and as this synonymy has not been disputed, it should stand."

The nearly-mature larvæ shown in fig. 3 measured 9 mm. This is the usual length. The pupæ (fig. 4) are a little shorter, measuring about 8.5 mm. in length. Arranged in pairs along the posterior margin of each dorsal segment of the abdomen are twelve stout setæ pointed with black. The adults (fig. 6) measure from 8 to 8.5 mm. in length. The greatest width is about 3 mm.

The galls (figs. 1 and 2) are of various sizes. The smaller ones, 6 mm. in length, containing the young larvæ; those 11 to 12 mm. in length and 7 mm. diameter containing the adult beetles.

The life-history of this species becomes all the more interesting from the fact that several other members of the genus have habits somewhat similar. *Lixus parvus* has been bred from galls in the stems of *Amelanchier*. *L. macer* was bred by Dr. Riley from the axis of the stems of *Chenopodium hybridum*. This species was also bred by Mr. Webster from *Helianthus*. *L. scrobicollis*, Boh., has been bred from *Ambrosia artemisiæfolia* and *Ambrosia trifida*.

EXPLANATION OF PLATE 3.

Fig. 1.—Gall, showing hole through which adult beetle has emerged.

Fig. 2.—Gall, showing the inside hollowed out, where the larvæ and pupæ live.

Fig. 3.—Mature larva.

Fig. 4.—Nearly mature pupa.

Fig. 5.—Proboscis, showing insertion of antennæ.

Fig. 6.—Adult beetle.

THE JAMES FLETCHER MEMORIAL FUND.

In addition to the list of subscriptions to the above fund, which was published in the July, 1909, number of the CANADIAN ENTOMOLOGIST, the following amounts have been received:

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Up to date there has been subscribed to the Fletcher Memorial Fund about \$1,700, which has nearly all been paid in. It has been decided to close the subscription list about the end of March, so it is hoped that any who have not yet subscribed to the Fund, but who wish to do so, will attend to this matter at once. The Committee hope to raise at least \$1,800. It has been decided to erect a drinking fountain at the Central Experimental Farm.—ARTHUR GIBSON, Sec.-Treas. of Committee, Experimental Farm, Ottawa.

A NEW WAX-SCALE FROM THE ARGENTINE.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

The Coccidæ of the Argentine Republic must be considerably more numerous than the records show. A carefully prepared list, with full bibliographical details, was published by Eugenio Autran in 1907 (Bol. Minist. Agricultura, VII), but it shows only 32 species. One may now be added; I have had it in my possession for a number of years, but only recently, with the assistance of Miss L. H. Falk, have I been able to examine it in detail.

Ceroplastes Lahillei, n. sp.

Waxy scale about 3 mm. long, $2\frac{1}{2}$ broad and $1\frac{1}{2}$ high, solitary or aggregated in masses more or less surrounding the branch, the wax of the different individuals then completely confluent; wax creamy-white, wholly without red or brown; dorsal patch oval, consisting of the elongate-oval dorsal nucleus, and the six lateral and one anterior plates surrounding it, having their several nuclei distinctly developed; caudal patch with a large dark spot, consisting of the caudal horn; lateral wax abundant, convex in section, more or less concentrically grooved, with the usual broad vertical bands of chalky-white secretion. In lateral view the dorsal patch is hardly or not visible.

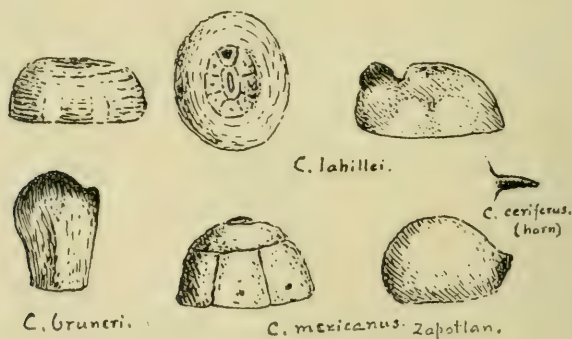


FIG. 5.

Female with wax removed very small, about 2 mm. long, $1\frac{1}{2}$ broad, $1\frac{1}{5}$ high; pale ochreous, with the broad low shining mammiform caudal horn deep chestnut-brown, in strong contrast; dorsum obtusely keeled, and sides with the usual tubercles. In lateral view there is a deep impression between the dorsal hump and the caudal horn.

March, 1910

Skin thick, strongly chitinized ; cephalic region remarkable for three broad lobes or tubercles, one on each side of the antennæ, and one between ; stigmatic spines very obtuse ; antennæ eight-jointed, joints 2 to 7 measuring in microns : (2) 37, (3) 52, (4) 60, (5) 37, (6) 37, (7) 30 ;

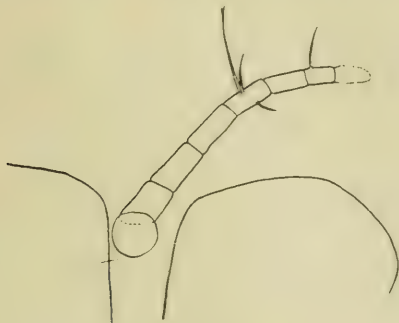


FIG. 6.—Antenna of *C. Lahillei*.

these antennæ are not quite like any others I have seen, but are rather similar to those of *C. formicarius*, *scutigera*, *brachyurus*, *purpurellus* and *Mexicanus*. Legs well developed (see figure) ; tarsal digitules with very distinct knobs, claw digitules incrassate. (The microscopic figures are by Miss Falk.)



FIG. 7.—Leg of *C. Lahillei*.

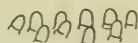


FIG. 8. — Stigmatic spines of *C. Lahillei*.

Hab.—Santa Ana, Argentine (Lahille). The bottle bears this label : "Sta. Ana (Misiones), Llana, No. 10, No. 8 Hem."

The genus *Ceroplastes* is evidently derived from some convex Lecaniid type, and from this point of departure presents a series of forms showing the most curious modifications, coincident with the greater development of wax. Some of the recognizable groups are as follows :

(1.) *C. denudatus* Ckll., of the Lesser Antilles, which is at first a typical *Ceroplastes*, but in age loses nearly all of the wax, and looks like a *Saissetia*.

(2.) Typical *Ceroplastes*, with convex scales, in which the lateral plates are large and reach the lower margin ; caudal horn usually moderate, and

directed posteriorly. I give a figure of *C. Mexicanus* Ckll., showing the scale and the denuded female, the latter with the caudal horn visible.

(3.) *C. ceriferus*, Anderson, and its allies, in which the wax is very thick, and the caudal horn, still directed posteriorly, has become very long, in order to reach the surface. I give a figure of the caudal horn.

(4.) *Ceroplastina*, n. subg.; type *C. Lahillei*. Wax abundant, pushing the plates on to the dorsal surface; caudal horn mammiform, directed upwards. Wax of different individuals often confluent. I give dorsal and lateral views of the waxy scale, and a lateral view of the denuded female. This subgenus may be considered to include other species with a similar female, such as the South American *C. Bergi* Ckll., and the African *C. Africanus* Green, and *C. egbarum* Ckll.

(5.) *Ceroplastidia*, n. subg.; type *C. Bruneri* Ckll. (see figure of denuded female). In this group the wax of the several individuals is thick and always confluent, and the female has become high and narrow. Strictly of this subgenus is *C. candela* Ckll. and King, from Natal.

The occurrence of closely related species of *Ceroplastes* in Africa and South America is noteworthy. These insects are arboreal, and it seems just possible that they have been carried across the ocean on floating trees, the wax serving to protect them from injury. It is perhaps more probable, however, that they are of great antiquity, and have reached the southern lands from the north.

THE ENTOMOLOGICAL COLLECTIONS OF THE LATE DR. JAMES FLETCHER.

The friends of the late Dr. Fletcher and many other Canadian entomologists will be interested to know that the whole of his private collection of insects is now deposited in the Division of Entomology, at the Central Experimental Farm, Ottawa. After his death Mrs. Fletcher asked the Honourable the Minister of Agriculture to accept the collection for the use of the Department, which the Hon. Mr. Fisher was very pleased to do. The collection is of a general character, but is particularly rich in diurnal Lepidoptera, to the study of which Dr. Fletcher paid particular attention. It is being gradually worked into the collections of the Division; and in addition to the mounted specimens, there is a very large amount of material in the shape of many hundreds of unmounted specimens. The addition of this collection to the collections of the Division of Entomology will render them all the more valuable and serviceable in the work of identifying Canadian insects for the many correspondents in different parts of the Dominion, which is one of the many useful functions the Division performs.—(C. G. H.)

DESCRIPTIONS OF NEW SPECIES OF *EUPITHECIA* FROM
EASTERN AMERICA.

BY GEO. W. TAYLOR, NANAIMO, B. C.

1. *Eupithecia Winnata*, n. sp.

Expanse, 25 mm.

This species is about the size of and superficially somewhat like *Eupithecia Youngata*, but the fore wings are longer and more pointed at the apices, the hind margins straighter and the tornos less rounded.

The colour is a rather bright brown.

Palpi short, rather stout. Head gray, with a slight brownish tint, paler between and behind the antennæ.

Thorax and abdomen above the colour of the wings; dorsal line on abdomen indistinctly marked by pale dots on segments; 1st segment pale; no black band on 2nd segment.

Fore wing rather bright brown, the central and submarginal areas a little darker. Basal lines very indistinct. Central area bounded not by lines, but by a lightening of the ground colour of the wing. There are, however, two series of black dashes on the veins, one set representing an intradiscal line and running outwards, and the other set representing the extradiscal line and running inwards. These dashes extend almost across the central area in some cases. Beyond the median band is a paler stripe divided into two by an indistinct brownish line. The submarginal area is broad, bisected by a wavy white line; this line runs in three sharp scallops from costa to vein 6, then in slight waves parallel to hind margin to vein 3, and thence in a conspicuous acute scallop to the tornos. Marginal line black, interrupted. Fringe paler than submarginal area, with darker spots at the ends of the veins. Discal spot small, lengthened, distinct.

Hind wing paler, very light at costa, dark smoky on inner margin. Traces of lines, the most conspicuous being the extradiscal, showing as dots on the veins. A fairly distinct zigzag white submarginal line; marginal line and fringe as on fore wing; outer margin flattened and indented at vein 5; discal spots very indistinct.

Beneath, much paler; discal spots on all wings large and conspicuous; two extradiscal lines, broken into venular spots on all wings; submarginal line on fore wing, faint, slight traces of other lines on hind wing; marginal lines and fringes as above.

March, 1910

Described from three specimens received from Mr. A. F. Winn, and labelled Montreal, 29 V to 3 VI, '05.

The last named specimen remains in my collection, thanks to Mr. Winn, and bears the type label.

Eupithecia grata, n. sp.

This is a very distinct species, and not likely when once seen to be mistaken for any other in our fauna.

Expanse, 25 mm.

Palpi long, rather stout. The whole upper surface pale fuscous, with cross lines of yellowish-brown.

The fore wings are short and wide, with outer margins well rounded.

Basal line evenly curved. Intradiscal much nearer to the basal line than usual, running outward at sharp angle from costa to cell, then back in an even curve to inner margin. Median line broad, distinct, parallel to intradiscal, just missing the faint discal dot by making a sharp angle at cell and running thence to inner margin in a wavy line. Extradiscal line narrow and very finely scalloped through the whole of its length, in general direction parallel to the median, but making a regular curve instead of a right angle at the cell. Submarginal line parallel to the extradiscal and of a like character. A very faint marginal dark line. Fringe long, faintly spotted.

Hind wings dusky. Discal dot round, rather large, but faint. The median and extradiscal lines of fore wing are continued right across the hind wing; no other lines are evident. Outer margin well rounded. Fringe as in fore wing.

Beneath, browner than above, discal spots and extradiscal lines on all wings rather distinctly reproduced. There is also a fainter median line, including the discal dots on each wing, and an indistinct submarginal shade.

The type specimen is in faultless condition, and was taken by Mr. C. H. Young at Ottawa on June 5, 1906, and though unique, has been most generously placed in my cabinet.

Eupithecia Gibsonata, n. sp.

This is a species about the size and shape of *Youngata*, *Winnata* and *Quebecata*, but it seems distinct from all three.

Expanse, 25 mm.

Palpi moderately long, rather heavy. Whole upper surface, soft pale brown with black cross lines. (*Youngata* is fuscous with pale cross lines.)

Fore wings moderately broad, with hind margins well rounded out. (In *Winnata* these margins are very straight and the wings pointed.)

Thorax with a whitish transverse line posteriorly and two minute black dots, one on each side the middle. Abdomen with black band on second segment.

Fore wing: Basal line evenly curved. Intradiscal very sharply angled at cell. Extradiscal curving inwardly from costa, then outwardly at cell, and thence in a series of scallops to inner margin; some black dashes running from this line inwardly on the veins. Crossing the median space are three fine lines, heaviest on the costa. The two outermost are subparallel to the extradiscal, but the innermost is not parallel to either intra- or extradiscal. This line includes a small black discal spot. There is a narrow pale band beyond the extradiscal line, bounded outwardly by an indistinct fine line, exactly parallel to the extradiscal; this space is divided by a similar fine line hardly visible, except on the veins.

The submarginal space is a little darker than the rest of the wing, and is divided by a distinct scalloped pale line. Marginal line fine, broken, but very black and distinct. Fringe moderate, faintly spotted.

Hind wing with the markings of the fore wing faintly continued, the intradiscal of fore wing becoming the basal line on hind wings. The pale extradiscal divided band of fore wing can be traced right across hind wing. Discal dot minute.

Beneath, fore wing lightly scaled, smoky: two median lines and the extradiscal marked on costa, and faintly visible across wing. Extradiscal pale band also traceable across all wings.

Hind wing a little paler: five cross lines quite distinct, two intra- and three extradiscal. Discal dots distinct.

The markings of the hind wings, both above and below, are very different from *Quebecata*.

Type, a female from Mr. C. H. Young. It is dated Ottawa, 9, VI. 3, and is in perfect condition.

I name this after Mr. Arthur Gibson, who has helped me very much with species of Ottawa Geometridæ.

Eupithecia fasciata, n. sp.

There can be no question but that this species is very closely allied to the *E. bifasciata* of Dyar, described from Kaslo. In fact, Dr. Dyar,

who was good enough to compare a specimen of *fasciata* with the type of *bifasciata*, was of opinion that they belonged to the same species.

But the type of *bifasciata* is not in the best condition, and my own specimens of *bifasciata*, taken in the type locality, seem sufficiently different from the eastern form to warrant the imposition of a new name.

It is hardly to be expected that a species of *Eupithecia* found in B. C. should also be found in Ontario and Massachusetts, and yet be wanting in all intermediate localities, and until specimens are found in such localities, or until by the study of more ample material the differences I rely on are shown to be inconstant, I think the better plan is to give the eastern form a name distinct from the western.

E. bifasciata Dyar, was described (Proc. U. S. Nat. Mus., XXVII, 891) as *Lephrocystis* (typographical error for *Tephroclystia*) *bifasciata*. The types were two in number. One taken on June 25 is in the U. S. National Museum, No. 7820, the other taken on June 13 is in Mr. Cockle's collection. I have a specimen exactly similar to this last named, and taken at the same place on May 17.

At a later date Dr. Dyar described *T. harlequinaria* (Proc. Ent. Soc. Wash., VII, p. 29, 1905) from two specimens from Victoria (E. M. Anderson) and one specimen from Seattle (O. D. Johnson). One of the Victoria specimens passed through my hands, and I have no hesitation in saying that it was merely a very brightly coloured, fresh specimen of *bifasciata*.

From these forms *fasciata* may be distinguished by its smaller size and duller coloration, and by the fact that in it the brown patch between veins 3 and 4 of fore wings does not interrupt the double extradiscal line, while in *bifasciata* these lines are obliterated. These differences are, it is true, very slight, but I am of opinion that a longer series of good specimens will show that the two forms are at least distinct geographical races.

E. fasciata may be described in detail as follows :

Expanse, 18 mm.

Palpi moderate. Thorax fuscous, a distinct white spot posteriorly. In *bifasciata* there is also a white median transverse bar on the thorax. There is no such bar visible in my specimens of *fasciata*, but this may possibly be due to their being in poor condition. Abdomen without blackish band on second segment; dorsal tufts black.

Fore wing long, pointed, outer margin not very full, very slightly angled at vein 4, ground colour light brown, with the lines and shadings blackish. Basal area and up to the median line (which runs through prominent black discal spot) blackish, all the lines being indeterminate. Median area, from median line to the extradiscal, clear brown, giving the appearance of a band across the wing. Extradiscal double, straight from costa to vein 8, then at a sharp angle outwards to vein 6, then in a regular curve to vein 1, and thence in a straight line to inner margin. These lines are followed by a narrow pale space. Submarginal area blackish, divided by a very fine wavy submarginal white line, and interrupted between veins 3 and 4 by a brown cloud extending to the margin. Marginal line black. Fringe short, brown, spotted with blackish.

Hind wings pale, except at extreme base. Three or four black extradiscal lines begin on inner margin, but rapidly fade away as they cross the wing. A submarginal darker shade. Discal dots small, round, faint. Fringe as on fore wings.

Beneath, abdomen and legs nearly white. Wings very lightly scaled. Discal spots distinct. On fore wings two extradiscal lines are faintly reflected. On hind wings one basal and three fairly distinct extradiscal lines can be traced from margin to margin.

Described from three specimens. One taken at Ottawa, 28th June, 1906 (Arthur Gibson). This is the one from which the description is mainly drawn. A second specimen was received from Mr. W. D. Kearfott, and was doubtless taken in New Jersey. The third was taken 25th June, 1906, at Winchendon, Mass., and is in the collection of Mr. L. W. Swett.

Eupithecia Quebecata, n. sp.

Expanse, 21 mm.

Thorax, abdomen and fore wings above, bright brown. Basal line black, running at a sharp angle to submedian vein, and then back at a right angle to the inner margin. Intradiscal line exactly parallel to the basal, running from the costa until it almost reaches the discal spot, and then at a right angle to inner margin. Two median fine wavy lines, one running through angle of intradiscal and the other through the black discal spot. Extradiscal line very pronounced, dislocated at subcostal vein, sending out conspicuous black dashes inwardly along the veins. Beyond the extradiscal is a pale space bounded by a dark line parallel to the

extradiscal, and divided by a black hair line. Submarginal space darker than the rest of the wing, and traversed by white zigzag submarginal line. Fringe lighter, with median dark line. Hind wing same shade of brown as fore wing, with many lines, at least two intradiscal and four extradiscal, and a white submarginal evident from margin to margin. Fringe same colour as wing, with darker spots opposite ends of veins.

Beneath lighter; the discals larger than on upper side, and nearly all the markings of upper side reproduced, the extradiscal and submarginal dark lines on all wings being heavy and diffuse. The direction of the intradiscal line on the fore wings above, in its relation to the two median lines, distinguishes this species from all the other species of eastern *Eupithecia* known to me. It is, however, a very near relative to the European *E. sobrinata* Hubner, of which at first I thought it might be a variety. Described from four specimens received from Mr. A. F. Winn, of Montreal, and taken at Biddeford, Maine, 23, VII, '99, and Kamouraski, Quebec, 23 and 26, VIII, '98.

My type labels are on two specimens retained in my own collection, and labelled Biddeford, 23, VII, '99, and Kamouraski, 26, VIII, '98.

Eupithecia fumata, n. sp.

Expanse, 24 mm.

This is one of our large species very near to *E. fumosa* Hulst. It differs from that species in the shortness of the palpi, in the greater fulness of the hind margins of all the wings, in being more heavily scaled beneath, and in having the extradiscal line on the hind wing below finer, and more distant from the discal spot. These (except the palpi) are slight characters, and may not amount to more than varietal differences, but my type specimen is in such perfect condition that I am tempted to name it.

There is no eastern species near to it except what I have identified as *fumosa*. The western *Eupithecia perfusca* Hulst, and its allies, *E. terminata* and *E. Slocanata*, are also near relatives of *fumata*.

Type, one ♀ taken at Ottawa, 9, VI, '06, by Mr. C. H. Young, and in my collection.

Eupithecia indistincta, n. sp.

Expanse, 28 mm.

This is the largest of our eastern species. The wings are longer but narrower than in *E. Packardata*, Taylor (*geminata*, Packard), which species *indistincta* much resembles.

The palpi are very short. The whole upper surface is a dull clay colour, paler than *Packardata*. Abdomen with very conspicuous black band on second segment, and small black dorsal tufts on other segments. The markings on the fore wings as in *Packardata*, but the discals are large and round instead of linear, and the dark spot on the costa, whence the extradiscal line proceeds, is further from the discal spot than it is in that species.

Hind wings as in *Packardata*, save that the discal spots are larger.

Beneath as in *Packardata*, but with the same differences as noted above.

The short palpi will distinguish this species from *fumosa* Hulst.

Types: 1. Catskill Mountains, 10, VIII, '99, Mr. R. F. Pearsall.

2. Sherborn, Mass., 14, VI, 1900, Mr. L. W. Swett.

The first named is in my collection, the second in that of Mr. Swett. I have other specimens taken at Toronto, Ontario (Saunders), and Newark, N. J. (Weidt).

A NOTE ON MR. JACKSON'S SYNOPSIS OF THE GENUS PEMPHIGUS.

BY G. W. KIRKALDY, HONOLULU, HAWAIIAN ISLANDS.

I have recently received a separate of this article, bearing no date, but apparently published during 1908.

As far as the part dealing specially with the Aphidæ is concerned, the contribution seems to be admirable, but the writer displays a lack of knowledge of Hemipterous literature and of the Hemiptera, as soon as he embarks upon speculation on the "derivation of the genus."

Basing my researches on those of Hansen, I have recently divided* the Auchenorrhyncha into two superfamilies, Cicadoidea and Fulgoroidea, fully discussing them. If, as Mr. Jackson asserts, the "Fulgoridæ do not secrete a waxy or flocculent material from abdominal glands, where is this material secreted from in that group? The interposition, moreover, of the Fulgoroidea between the Cercopidæ and the Membracidæ is an old Fieberian misconception, faithfully followed by all subsequent authors except Hansen and myself; it is not *in the least* warranted by the structures or habits of the groups in question.

*Bulls. I and III of the Hawaiian Sugar Planters' Div. Ent., 1906 and 1907. March, 1910

Mr. Jackson's diagram on p. 177 cannot be adopted. The Sternorrhyncha must have branched off from the main Homopterous stem before the latter was differentiated into superfamilies, while the association of the

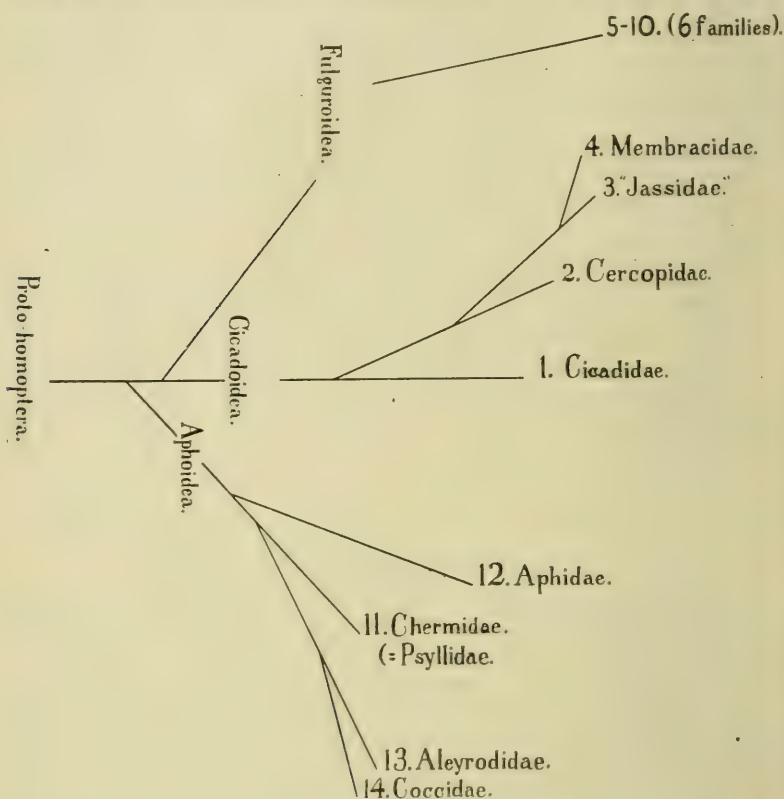


FIG. 9.

Cercopidae and "Fulgoridae" as "twin twigs" of a branch almost equal to the Membracidae or "Jassidae," is positively ridiculous.

The following represents more accurately the course of Homopterous evolution: The Fulgoroidea are much more distinct from the rest of the Auchenorrhyncha than these are among themselves; the Cercopidae, Membracidae and "Jassidae" are all very closely allied, the Membracidae being simply highly specialized "Jassidae."

I have not sufficiently studied the Sternorrhyncha as yet, but I think they form only one superfamily, which may be termed "Aphoidea."

ON SOME NEW SPECIES OF *MESOLEUCA* ALLIED TO
MESOLEUCA HERSILIATA, GUENÉE.

BY GEO. W. TAYLOR, NANAIMO, B. C.

The conspicuous insect described by Guenée as *Cidaria hersiliata* (Spec. Gen., X, 464) is well known to all American collectors of Geometridæ, although it does not appear to be anywhere very plentiful. Guenée's type was from "Canada."

Walker redescribed this moth under the name *Larentia flammifera* (Cat. Lep. Het. Br. Mus., XXIV, 1184). He possessed three specimens, all females, two being from Trenton Falls, New York, and one from Orillia. Walker noted two forms, and Mr. Pearsall (CAN. ENT., XLI, 119) tells us that one form was certainly *hersiliata* of Guenée, but the other, "variety β ," was a distinct species, to which he (Mr. Pearsall) gives the name *M. Walkerata*. I have not myself yet met with *Walkerata*, but have little doubt that it is a good species. At the same time, I am by no means sure that it is Walker's var. β , as the description of that form is altogether too vague, and, moreover, both Packard and Hulst, after an examination of Walker's types, pronounced *flammifera* and *hersiliata* to be synonyms.

Packard, in 1876 (Monograph III, pl. 8, figs. 41, 42), had a larger amount of material, including at least one western specimen. He wrote a description, to include all the forms before him, and made no attempt to separate two species.

Dr. Hulst, in 1896, with still more abundant material, described one form from Nevada as *Mesoleuca ethela*, and another from Colorado as *Philereme formosa*, a very extraordinary generic reference.

All the forms above mentioned I have, I think, made out, except Pearsall's *Walkerata*, but as my eastern material is not very ample, and as Mr. Pearsall says that *Walkerata* is very rare, the exception is not surprising.

Of *hersiliata* (typical) I have specimens from various eastern localities, and also from Manitoba and Calgary. A very beautiful variety from Meech's Lake, near Ottawa (C. H. Young, 24, 6, '04), deserves a name, and I have called it variety *mirandata*. It differs from the type in having the central band quite clear of lines, and of a wine-red colour, instead of being the usual black or gray.

M. formosa is represented in my collection by one specimen only. It very closely resembles the photograph of Hulst's type, kindly given to
March, 1910

me by Mr. Grossbeck. My specimen was bred by Mr. T. N. Willing from a green caterpillar with faint whitish lines, found on currant at Regina. The caterpillar pupated 12th June, 1905, and the moth emerged on the 28th of the same month.

M. ethela, Dr. Hulst's second new species, is a very well marked form, and is perfectly constant. It is distinguished from all the others of the *hersiliata* group by having the space between the basal and intradiscal lines on the fore wings cream-coloured. The contrast between this band and the dark central fascia is very striking, and the moth is a most beautiful one. *M. ethela* was described from Nevada, but all my specimens are from British Columbia.

Beside these forms, I have five others, all from British Columbia. Four of these I consider to be good species, and I will describe them as such. To the fifth I have given a varietal name. They all of them so evidently belong to the *hersiliata* stock that I shall describe them by comparing them with the typical form, which is sufficiently well known.

Mesoleuca occidentata, n. sp.—Expanse, 29–30 mm. This is more like the typical *hersiliata* than any of the species following. The style of coloration is the same, but the slight differences to which I shall call attention seem to be constant.

The outermost of the two basal lines on the fore wings leaves the costa at a sharp angle, so that if it were continued in the same direction as that in which it runs to the subcostal vein, it would cut the hind margin of the wing. The basal area also is much larger, and the two parallel basal lines are more distinct than in *hersiliata*.

The central fascia is not narrowed quite so much below vein 1 as it usually is in *hersiliata*. The rust colour which pervades the submarginal band in *hersiliata* is much reduced in *occidentata*, and the central fascia is of a darker colour in the last-named species.

The hind wing in *occidentata* is comparatively clear, but the discal spot is distinct, and the very heavy extradiscal line of the under side is reflected.

On the under side all the markings on both fore and hind wings are heavier than in *hersiliata*, especially the extradiscal lines, and the space within these lines is darker than that without.

This species is described from seven specimens in my collection, taken at Wellington and Departure Bay, on Vancouver Island, and at Salem, Oregon. The dates are 15th June to 25th July.

I have marked as types a ♂, Wellington, 15, VI, '05, and a ♀, 8, VII, '04.

M. mutata, n. var.—In three specimens of *M. occidentata*, two being from Victoria and one from Wellington, the median band is much narrower, and is lighter centrally than in the seven specimens noted above. The intradiscal lines are connected across the band by dark lines on the veins, forming a series of ringlets below vein 4. The coloured extra-basal bar is narrow and reddish-brown in colour, rather than orange.

Mesoleuca decorata, n. sp.—Expanse, 30–31 mm. This species, though preserving the same style of markings, is more unlike *hersiliata* than the two forms just described.

The characteristic orange bar is in *decorata* reduced to a grayish cloud. The parallel extrabasal lines are more wavy. The central band is wider, and shows two cross lines, one on each side of the discal dot and parallel to the intra- and extradiscal lines respectively. The space enclosed by the two median lines is usually quite clear, though sometimes clouded. The discal dot is small and round, not a dash as in *occidentata*. The submarginal white line is fairly distinct, and the scallops are marked within by coffee-coloured spots, the most evident of which are opposite the discals.

On the hind wings there is a faint discal dot, and an angulated extradiscal dot as in *occidentata*. There is also a very indistinct submarginal scalloped line, with a coffee-coloured shade within it.

Below all wings are slightly tinged with yellowish, and the markings of the upper side are faintly reflected. The discal points are black and distinct. The extradiscal line is distinct on the hind wings, but not nearly so heavy as in *occidentata*.

This seems to be a commoner insect on Vancouver Island than is *occidentata*.

It is described from ten specimens from Victoria, Wellington and Departure Bay, all taken between 3rd and 25th July.

I have placed my type labels on a ♂, Departure Bay, 20, VII, '08, and two ♀ ♀'s, Departure Bay, 25, VII, '08.

Mesoleuca boreata, n. sp.—I have two specimens taken near the Stickeen River, in Northern British Columbia by Mr. Theo. Bryant, 24th July, '05, and 25th July, '05.

They are in poor condition, most of the markings being obscured, but the extrabasal bar is quite distinct and perfectly *black* instead of red or yellow. The extradiscal lines on the fore wings above are also distinct, very fine and black. In other respects these specimens resemble the variety *mutata*.

The black extrabasal bar readily distinguishes this form from any other I have seen.

Mesoleuca Casloata, n. sp.—Expanse, 30 mm. Wings longer and narrower than usual in the case of *hersiliata*, and the colouring is duller than in that species.

The extrabasal bar is dull brown, and fills the space between the extrabasal and intradiscal lines. The intra- and extradiscal lines are scalloped, but the scallops are more angular than in *hersiliata*.

The submarginal white scalloped line is very distinct, and is parallel to the margin of the wing throughout almost the whole of its length, not being dislocated below the costa as in *hersiliata* and *occidentata*. A dull brown band precedes this line, and is continuous right across the wing. The margin of the wing beyond the submarginal line is blackish-gray like the central band.

Between the extradiscal line and the submarginal brown band there is a light blotch on the costa, followed by an almost black costal spot and a subapical streak.

This seems to be the form representing *hersiliata* in the Kootenay district. My three specimens are all from Kaslo (Mr. J. W. Cockle). My lightest specimen shows an approach to *M. ethela*, and I suspect it was a specimen of this form that led Dr. Dyar to suggest that possibly *ethela* and *hersiliata* might be found to intergrade.

NOTES ON TENTHREDINOIDEA, WITH DESCRIPTIONS OF NEW SPECIES.

BY S. A. ROHWER, WASHINGTON, D. C.

PAPER IX.—XYELIDÆ AND LYDIDÆ.

North American species of Pleroneura.

- Head and thorax black 1.
 Head and thorax not black 2.
 1. A distinct fovea outside of each lateral ocelli; 1 tr. cu. and 1st. recur.
 n. not interstitial; pronotum black; ♂ (*fulvicornis* Roh.)
 No fovea outside of the lateral ocelli; the 1st recur. n. and 1st tr. cu.
 interstitial; pronotum lined with white; ♀ (*bruneicornis* Roh.)

March, 1910

2. Postocellar line strongly present; anterior lobe mesonotum punctured as side lobes; length, 4.5 mm.; not marked with black. *lutea* Roh.
 Postocellar line absent; anterior lobe of mesonotum more closely sculptured than side lobes; length, 6 mm.; thorax above and abdomen above marked with black. *Koebelei* Roh.

Pleroneura fulvicornis, n. sp.—♂. Length, 5 mm. Anterior margin of clypeus with a broad obtuse triangular tooth; malar space very narrow; narrow, deep furrows from the antennae to above anterior ocellus, where they meet; middle fovea elliptic, with a shallow depression to anterior ocellus; a fovea at the side of each lateral ocellus; apical antennal joint shorter than preceding; head and thorax opaque, with close, fine punctures; maxillary palpi very large, 7-jointed, the second joint about the same length as the anterior femora, the first joint about one-third as long as the second, the last five joints smaller and not so rigid; labial palpi 4-jointed; tarsal claws as in *Xyela*, with a small tooth at base; hypopygidium rectangular, the apex almost truncate; intercostal nervure about the length of the same nervure in *Neurotoma fasciata*, but the free part of sc_2 is present; first recurrent n. in second cubital quite free from first tr. cu.; hind wings as in *Neurotoma fasciata*. Colour black; antennae, clypeus, labrum, tegulae, legs, venter and palpi rufo-fulvous; wings yellowish hyaline, iridescent; venation pale brown.

Type locality: Placer Co., Calif. One ♂, June. Type, Cat. No. 12749, U. S. N. M.

Pleroneura bruneicornis, n. sp.—♀. Total length, 5.75 mm.; length of ovipositor, 1.5 mm. Anterior margin of clypeus truncate, with a small triangular tooth in the middle; antennal furrows meeting above the anterior ocellus, as in *fulvicornis*, but above the middle of the head they are indistinct; no fovea at side of lateral ocelli; palpi as in *fulvicornis*; head opaque, closely granular or finely punctured; thorax above subshining, with distinctly separate, small punctures; sheath about as long as the abdomen, gradually tapering to apex, but more strongly so below; legs as in *fulvicornis*; wings as in *fulvicornis*, except the first recurrent is interstitial with first tr. cu. Black; mandibles, line on pronotum and tegulae pallid; clypeus, labrum, palpi, legs, venter and three apical segments rufo-fulvous; hind tibiae infuscated; wings hyaline iridescent; venation pale brown.

Type locality: Gloversville, N. Y. One ♀, April 30, 1907. C. P. Alexander.

Type, No. 12750, U. S. N. M.

Differs from *fulvicornis* in absence of fovea, by lateral ocelli; venation, tooth on clypeus and other characters.

Pleroneura Koebelei, n. sp.—♂. Length, 6 mm. Anterior margin of the clypeus rounded in the middle, with a small obtuse tooth; antennal furrows deep, meeting above the ocellus on a line between the lateral ocelli; postocellar furrow not present; lateral furrows of the postocellar area shallow; middle fovea shallow, elongate; palpi as in *fulvicornis*; head opaque, with fine punctures; middle lobe of the mesonotum more closely sculptured than the lateral lobes, which have separate punctures; claws with a small tooth at base and a long seta at apex; venation nearly as in *fulvicornis*; hypopygidium about as wide as long, at the apex nearly truncate. Colour reddish-brown; middle lobe of mesonotum, scutellum, metathorax above, dorsulum, except three apical segment, black. Wings yellowish-hyaline, iridescent; venation pale reddish-brown.

Type locality: Oregon. Koebele.

Type, No. 12752, U. S. N. M.

Pleroneura lutea, n. sp.—♂. Length, 4.5 mm. Anterior margin of the clypeus truncate, the sides rounded and an obtuse tooth in the middle; antennal furrows narrow and deep, meeting on the postocellar furrow, which furrow is distinct; postocellar area indistinct and parted in the middle by a faint furrow; head and thorax opaque, with fine punctures, which are uniform; claws and venation as in *Koebelei*; hypopygidium slightly narrowing toward the apex, which is nearly truncate. Head, antennae and thorax reddish-luteous; clypeus, labrum, legs and abdomen luteous; wings glassy-hyaline, iridescent; venation luteous.

Type locality: Oregon. Koebele.

Type, No. 12751, U. S. N. M.

Nearest to *P. Koebelei*.

Cephaleia fulviceps, n. sp.—♀. Length, 11.5 mm. Anterior margin of clypeus slightly notched in the middle, the clypeus sculptured like the front; no fovea on the head, and the lateral boundaries of postocellar area faint; front closely punctured; vertex and posterior orbits sparsely punctured; antennae 26-jointed, third joint subequal with 4 and 5; mesonotum and scutellum shining, with close, fair-sized punctures on all the sutures; scutellar appendage finely granular; legs normal for genus; abdomen with a velvety appearance, due to the close reticulation; venation like *Cephaleis abietis* (fig. 42, pl. XXVI, No. 1438, P. U. S. Nat.

Mus.), except that the tr. rad. is interstitial with 2nd tr. cu. Colour black; head fulvous, except a black spot enclosing the ocelli and extending down to the antennæ; wings dark brown, iridescent; venation brown.

Type locality: Atlantic Co., N. J.

Type, No. 12753, U. S. N. M.

Allied to *C. frontalis* (Westw.), but is smaller, the pronotum is black, the puncturing of mesonotum different.

Cænolyda Nortoni, n. sp.—♀. Length, 9.75 mm. Anterior margin of clypeus broadly produced in the middle, the middle portion of clypeus gently convex; head, except outer part of antennal fovea, with shallow, separate punctures; orbital carinæ as in *Itycorsia*; middle fovea wanting; lateral postocellar furrows converging to occiput, no middle longitudinal furrow; antennæ about 28 jointed, third subequal to 4+5; labrum subquadrate, the apical middle with a long tooth; middle lobe of mesonotum and scutellum shining, impunctate; lateral lobes of mesonotum and pleuræ with widely separate punctures; legs normal; venation differs from *Cænolyda* (fig. 38, pl. XXV, P. U. S. N. M., 1906, XXIX), in a little longer 3rd cub., and the tr. rad. is interstitial with the 2nd tr. cu.; abdomen finely granular; last ventral abdominal segment broader than long, the apex at the sides rounded. Colour dark reddish-brown; lower part of pleuræ, pectus and a few ill-defined spots on thorax above piceous; postocellar spots, cheeks and antennæ yellowish; wings hyaline, glassy, veins dull brown.

Type locality: Maine.

Type, No. 12776, U. S. N. M.

I am not sure what this species is related to. In colour it is like *Pamphilius apicalis*, Westw., but that species is *Lyda* sens strict.

Itycorsia Kincaidi, n. sp.—*Itycorsia marginiventris* (Cress.) Kincaid, P. Wash. Acad. Sc., II, p. 344, 1900.

♀. Length, 10 mm. Anterior margin of clypeus straight; entire head, including clypeus, densely punctured, more closely and finely so on the front; a very small elongate middle fovea; only the lateral postocellar furrows present; mesonotum and scutellum shining, the middle area with punctures; mesopleuræ punctured similar to the head; antennæ about 30-jointed, third joint equal to 4+5; abdomen opaque, with close tessellation; apical ventral segment of the abdomen broader than long, the apex semicircular; labrum at apex truncate; venation nearly like *Lyda erythrocephalia* (fig. 37, pl. XXV, P. U. S. N. M., XXIX, No. 1438), but

differs in the ba. joining the cu., as in *Cephaleia*. Colour black; anterior margin and middle of clypeus, spot on lower inner orbits, spot at summit of eyes, forked spot above the antennæ, posterior orbits and occiput, usual postocellar spots, entire margin of prothorax, anterior lobe of mesonotum posteriorly, spot on scutellum, spot on side of lateral mesonotal lobes, broad oblique line on the pleuræ, narrow lateral margin of abdomen, *pallid*; legs black: tibiæ and tarsi rufo-ferruginous. Wings dusky hyaline, iridescent: venation fuscous. Head and thorax with long, black hair. Mandibles piceous.

Type locality: Sitka, Alaska, June 16, 1899. (T. Kincaid.)

Type, No. 12761, U. S. N. M.

This is the species recorded as *Itycorsia margiventris*, by Kincaid (P. Wash. Ac. Sci., II, p. 344, 1900), but *margiventris* is *Lyda* sensu strictiore according to Dr. MacGillivray, who has seen the type. *I. Kincaidi* also differs from *L. margiventris* in the colour of the legs and the pale spot on the pleuræ.

Itycorsia nivea, n. sp.—♀. Length, 10 mm. Anterior margin of clypeus semicircular, the surface of clypeus shining, with large separate punctures; head, except a shining, impunctate spot on lower inner orbits, closely punctured, those on the vertex larger and more separate; middle fovea elongate, but not strong; only the lateral postocellar furrows present; antennæ long, slender, about 30-jointed, the third subequal to the fourth and fifth; mesonotum with large separate punctures (in an area above the tegulæ they are wanting); mesopleuræ striato-punctate; abdomen as *Kincaidi*; wings in poor condition, the basal joins the cu., as in *Kincaidi*. Labrum shining, rounded at the apex. Colour as *Kincaidi*, except as follows: The antennæ are reddish-yellow, the lateral markings of the mesonotum are connected to the anterior one, the coxæ beneath are white, and the legs below femora are paler. Wings hyaline, venation pale brown. Mandibles, except piceous apex, yellow.

Type locality: Kokanee Mts., British Columbia; alt. 9,000 ft.; Aug. 10, 1903. (A. N. Caudell.) "Collected upon snow."

Type, No. 12762, U. S. N. M.

Closely allied to *I. Kincaidi* Roh., but the labrum is rounded at the apex, there is a shining area on lower inner orbits, and the antennæ are pale.

Itycorsia lutcopicta, n. sp.—♀. Length, 12 mm. Anterior margin of clypeus truncate, the sides subparallel, the angles obtusely rounded,

surface shining, sparsely punctured; antennæ about 35-jointed, 3 subequal to 4 + 5; head shining, polished, with shallow, widely-separate punctures; a large impunctate spot on the lower inner orbits; middle fovea deep, spear-shape, with the long point above; lateral postocellar furrows distinct, converging to the occiput, postocellar area parted by a longitudinal furrow; anterior lobe of mesonotum and scutel impunctate; prothorax, lateral lobes of mesonotum and pleuræ punctured like vertex; laterally the pronotum has a large hump; legs normal; venation as in *I. Kincaidi* Roh.; abdomen finely reticulate; last ventral segment of the abdomen almost as long as wide, the apex gently rounded. Colour reddish-brown; clypeus, labrum, mandibles, smooth inner orbital area, posterior orbits, four longitudinal lines on vertex, anterior lobe of mesonotum, scutel, part of lateral lobes, pleuræ and abdomen straw-yellow; antennæ and legs darker than body, partly brown. Wings hyaline, venation brown.

Type locality: Minn. Collection of W. H. Ashmead.

Type, No. 12763, U. S. N. M.

This species is allied to *I. brunnicans* (Nort.), but the scape is shorter, the last ventral segment is nearly as long as wide (not half as long as wide as in *brunnicans* Nort.), the labrum has a long spear-shaped tooth (not broad with the anterior margin triangular, as in *brunnicans*), and the colour is lighter. It is not marked with black, as is *I. ochrocera* (Nort.).

THE LARCH SAW-FLY (*LYGÆONEMATUS ERICHSONII*, HARTZ.) IN MINNESOTA.

BY A. G. RUGGLES, ST. ANTHONY PARK, MINN.

The Larch Saw-fly has become a very serious pest on the tamaracks in northern Minnesota. Reports of damage from several parts of the State came to the Minnesota Entomologist's office during the fall of 1909. The writer, in July, examined the damage that had been done to the tamaracks in the State preserve of Itasca Park. This park, a primeval forest of fifty square miles, contains within its borders Lake Itasca, the source of the Mississippi. Attention was first attracted to the great amount of timber, dying or dead, in the swamp regions around the shores of the lake. At first it was thought that the trees were being killed by an excess of water, but upon closer examination it was proved beyond a doubt that *L. Erichsonii* was the cause. The moss under any of these trees, on being turned over, revealed many thousands of cocoons. Under absolutely dead trees only empty cocoons were found, but under trees

March, 1910

showing some sign of life. both empty cocoons and those containing living saw-fly larvæ were taken. The extent of the area infested by this insect was shown by the failure to find a single tamarack tree in this park, on high or low ground, under which, covered by the moss, were not some of the caterpillars in their cocoons. To be sure, the park is not very large; nevertheless, it shows something of the distribution of the insect. Other considerable areas east and north of the park show a like distribution.

At the time of arrival in the park, July 20th, the saw-fly larvæ were all mature. A few days afterward they had disappeared. On going through the woods and over the swamps one could find thousands of dead larvæ. drowned in little pools of water under the trees. Brook trout (*Salvelinus fontinalis*, Mitch.) caught in a small brook which runs through one corner of the park, always looked very plump, and upon examination their stomachs proved to be gorged with saw-fly larvæ.

Many cocoons were collected, and by next year it should be known whether many or any species of parasites destructive to this pest are at work.

TWENTY-SECOND ANNUAL MEETING OF THE AMERICAN ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.

The twenty-second annual meeting of the American Association of Economic Entomologists was held at the Harvard Medical School (Brookline), Boston, Mass., December 28 and 29, 1909. The first session was called to order by President W. E. Britton, of New Haven, Conn., who presided throughout the meeting, and who delivered the annual address on, "The Official Entomologist and the Farmer." The programme was crowded with papers which were of great economic importance to the Entomologist and the Agriculturist, although a few were more technical in character, and dealt with some of the fundamental principles of scientific investigation of entomological matters. A discussion of different methods used in research work was of particular interest, as was also the reports of the progress that is being made in the field and parasite work in New England, for the purpose of controlling the Gypsy and Brown-tail moths. A report by Dr. W. P. Headden, of Colorado, concerning the injury to fruit trees caused by arsenical spraying, and the discussions that followed, brought out many new ideas on this important subject. An exhibit made by the local entomologists and members which was held in

an adjoining room, contained samples of apparatus and breeding devices, as well as insect collections, which added much interest to the meeting. On Tuesday evening the Association and the Entomological Society of America were the guests of the Cambridge Entomological Club, and on Thursday morning the members had the opportunity of witnessing a spraying demonstration at Arlington with high-power sprayers, as the guest of Mr. H. L. Frost.

The attendance at each session numbered over 100 members and visitors, nearly every section of the United States and Canada being represented.

The Association commended the work which is being done to control the Gypsy and Brown-tail moths in New England, endorsed the bill before Congress to provide for the establishment of standards of purity of insecticides and fungicides, and advocated the passage by Congress of a national law to prevent the importation of dangerously injurious insects and fungus diseases from foreign countries.

The report of the Secretary showed that the Association was increasing in membership, and was in good financial condition. The Journal of Economic Entomology, which is the official organ of the Association, was also reported by the business manager to be in a thriving condition.

The following officers were elected for the ensuing year: President, Prof. E. D. Sanderson, Durham, N. H.; First Vice-President, Dr. H. T. Fernald, Amherst, Mass.; Second Vice-President, Prof. P. J. Parrott, Geneva, N. Y.; Secretary, A. F. Burgess, Washington, D. C.

SYNTOMID MOTHS WITH BANANAS.

BY J. WM. COCKLE, KASLO, B.C.

The article on the occurrence of the various forms of *ceramidia*, by Prof. Cockerell, published in the February number of the CANADIAN ENTOMOLOGIST, has suggested to me that many collectors could avail themselves of the opportunity of collecting these beautiful moths if they were aware of the prevalence of them amongst bananas. Besides the capture of the specimen recorded by me in the CANADIAN ENTOMOLOGIST for 1904, I have secured at various times quite a number of cocoons of this genus.

Pupation takes place in the centre of the bunch of bananas, the cocoon being generally attached to the centre stalk. The pupa is enclosed

in a loose web of brown silk, and numbers of them may be found by careful examination of banana stalks. Climatic changes, cold storage and other causes may account for the very few imagoes that are seen; and besides this, the larva is attacked by a Hymenopterous parasite. Of these latter I have secured three specimens at different times. To any one who is interested in securing specimens of these moths, I would suggest the plan of closely examining partially-depleted bunches of bananas when hanging in the fruit stores, especially during the winter months, when other sources for collecting are unavailable, and possibly in some cases the store-keeper may be induced to keep a lookout for the cocoons if a description of them is given him. From my own experience in a small town where only a very limited number of bananas are sold, I am satisfied that quite a large percentage of the bunches of fruit are infested by the larva of these moths.

When specimens are discovered it should be an easy matter to trace through the wholesale houses the original locality from which the fruit was imported. In this way many valuable records may be secured.

I have suggested to Dr. Dyar that as the Kaslo specimen differs from the other known specimens of this genus, a description of it is desirable.

ANOTHER APPEAL FOR EVERES COMYNTAS AND AMYNTULA.

My appeal last year was very kindly taken up by several Canadian entomologists, but mostly in the West. I should be very grateful for more specimens from the Eastern States.

The result of my examination of the specimens from the West leads me to the conclusion that Winnipeg is about the dividing line. I received a few very interesting specimens from Manitoba, and I should be greatly obliged for more material from there, as also from Assiniboia and Saskatchewan. The forms showed a transit from *comyntas* to *amyntula*, differing in some respects from each. I should also be glad if observers could tell me how many broods they have noticed, and whether there is a gap between each or whether they overlap. As far as I can gather at present there seems to be some diversity on this point in different districts.

I gladly take this opportunity of thanking my various correspondents for their kind help.—G. I. BETHUNE-BAKER.

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GEORGE WILLIS KIRKALDY.

1873-1910.

The fulfilment of sad duties is the lot of man. To me has come that of making known the death, in the flower of his manhood, of George Willis Kirkaldy, my good friend.

After a separation of some months from his wife and little one, whom he worshipped, he went to San Francisco, where they were, to spend the Christmas holidays with them. While there he was induced to submit to a fifth operation on an old fracture of the leg, and although it was successful, he grew gradually weaker and weaker, and less than a week later, on the 2nd of February, he breathed his last. That acute intellect, that ceaseless, untiring worker was at rest. His course was run, and he fell ere he grasped the bays that were to crown his achievement.

George Willis Kirkaldy was born at Clapham, near London, England, in 1873, and was therefore in his 37th year. From his youth he evinced a great love for natural history, but after finishing his studies in the City of London School, he went into the city, where he remained until 1903, when he accepted a position in Honolulu, with the Hawaiian Department of Forestry and Agriculture. Then began the happiest and most productive period of his life, and there also he met with the accident that eventually was to deprive the world of the most promising of the younger generation of scientific hemipterologists. Shortly after his arrival in Honolulu, while out riding, he forgot the American rule of the road, and turned his horse, after the English fashion, in the left as he came to a turn in the road, and crashed into a carriage coming in the opposite direction. His horse fell on him and crushed his leg. This was badly set, and after the bones had knit, it had to be broken again and reset. This operation was repeated at intervals no less than four times, the last with fatal results. There, too, he met the lady who became his wife; there his little ones were born, and his little son, George, the first and best beloved, died in infancy.

Freed from the sordid details of clerical work, in his new position he was in his element. He did not, indeed, care greatly to work on other

groups of insects, and at times the daily routine of the economic entomologist was irksome, but nevertheless, whatever he did was done well, and he found time to dedicate to his researches in the Hemiptera, although nearly all the work he did was done at home in the evenings, after the day's task was over. Yet, in spite of the limited time at his command, he was able to produce enormous quantities of work of the highest character. At some time in the near future I hope to be able to give at greater length an account of his work. For the present, I shall merely mention his great work on the Jassidæ in connection with the Sugar Planters' Association work on the parasites of the sugar cane, and the general Catalogue of the Hemiptera, now in course of publication, both of which mark epochs in Hemipterology. Like every earnest worker in the Hemiptera, the nomenclatorial chaos into which the order had fallen soon forced itself upon his notice, and much as he disliked to neglect the biological phases of the group, he was impelled to endeavour to place this important branch of the subject on a stable basis. In the pursuit of this laudable object, he was forced by the sheer logic of circumstances to take radical and iconoclastic measures, but he regretted just as keenly as any of his opponents and critics the necessity of doing away with many a name hallowed, as it were, by long usage.

Kirkaldy had all the vivacity and ardour of the Celt, which may at times have led him to accept perhaps too quickly and maintain too enthusiastically views which a more mature judgment showed to be untenable. Joined to this was a relentless Scotch logical temperament, which drove him inexorably and unswervingly to conclusions which at times were opposed to his natural inclination, yet which his passion for truth compelled him to accept and battle for. Above all things he hated sham; he loathed that spirit of pompous and self-sufficient importance which curses some small men. A constant and tireless worker, a minute, patient, resourceful student, he ever looked singly to the advancement of the knowledge of the Heteroptera, that group so sadly and shamefully neglected in comparison to other orders. In that bright galaxy where shine the illustrious names of Fabricius, Burmeister, Dufour, Amyot, Fieber, Stål, and in our days, most happily still with us, of Reuter, Horváth, Montadon, Bergroth, his is not the dimmest, and had Azrael held his hand, he had shone among the most brilliant.

As for me, I have lost a leal friend, an inspiration and a lode-star; one who encouraged me when I was faint, who helped me when I fell; to

whose constant words of cheer I owe what little success I may have achieved. Our minds moved in harmonious accord; our gifts were complementary to each other, and in so far as one so insignificant might, I helped my friend in my small way, a feeble return for his many kindnesses.

Better than any, perhaps, I can gauge the loss to science by his untimely death. His work planned, outlined in many a letter, carried out with his enthusiasm, his thoroughness, his energy, was destined to place him on the same lofty, still eminence where sits Stal alone, beyond the reach of the petty bickerings and disputes of the pseudo-great.

"And so the grim reaper reapeth among the flowers."—J. R. DE LA TORRE BUENO, New York.

A DECENNIAL CONFSSION.

BY J. M. ALDRICH, MOSCOW, IDAHO.

In Entomological News, XI, 531, 1900, I published a list of corrections to my work on Diptera up to that time; the decade since then has, I regret to say, furnished me with materials for a similar list at the present time. With due humility I make the following confession:

In the February, 1909, number of the CANADIAN ENTOMOLOGIST I published a paper on *Rhagoletis*, describing a new species, *intrudens*, which had injured cherries in British Columbia and presumably in Idaho. Immediately after the publication of the article, Mr. Coquillett informed me that my new species was the same as Osten Sacken's *fausta*, of which he had material from the type locality. Since then I received a pair of *fausta* from M. C. Van Duzee, collected at Kearney, Ont. There is no doubt that I misunderstood a statement of Osten Sacken's, where, after mentioning the basal cross-band of the wing, he goes on to say, "The black colour begins exactly where it does in fig. 10, and encloses a hyaline triangle reaching from the costa to the interval between the third and fourth veins." Eastern specimens prove that this statement refers to the black colour in general, not to the basal cross-vein.

In the same article I should have included in the table *Rhagoletis grindeliæ* Coquillett, (Proc. Ent. Soc. Wash., IX, 146,) reared from flower-heads of *Grindelia squarrosa* at Clarendon, Texas; it is readily distinguished from all the species in my table by having the scutellum wholly black. The life-history of *Rhagoletis suavis* Loew, was already known, having been published by Babb, (Ent. News, XIII, 242); the larva lives in the outer hull of growing walnuts at Amherst, Mass. So there are six species with larval habits known, instead of four.

April, 1910

In Transactions of the American Ent. Soc., XXXIV, 67-100, 1908, I published in conjunction with one of my students, P. S. Darlington, a revision of the Helomyzidæ. The *Eccoptomera americana* Darl., therein described is a synonym of *E. simplex*, described four years earlier by Coquillett from Nevada, and overlooked by us. The genus *Siligo*, Ald., in the same paper is a synonym of *Zagonia*, Coq., (Invert. Pacif., 27), and belongs to the Geomyzidæ, as correctly placed by Coquillett. My species *oregona* appears to be distinct from his *flava*; my *litorea*, however, is a *Geomyza*, differing in the dark body colour and bristles, and narrower cheeks. The genus *Geomyza* has not heretofore been reported from North America, but I have three species from the California region and a single specimen of a fourth species from Lawrence, Kans. Named European specimens of *Geomyza* in Professor Melander's collection put me right on this genus. My ignorance of the family Geomyzidæ was responsible for my mistake; there is really a close relation between Helomyzidæ and Geomyzidæ, some of the latter having setules on the costa. The main difference is in the auxiliary vein, distinct in Helomyzidæ, not so in Geomyzidæ. I drew the wing of *Siligo* from a specimen mounted in balsam, wherein the pressure of the cover-glass had separated the auxiliary and first veins to an abnormal extent. It was a consolation to read since the discovery of my error that Loew once described a *Geomyza lurida*, which on examination of the type turns out to be a *Leria* (Czerny, Wien. Ent. Zeit., XXII, 126)!

In Biologia Centrali-americana, Diptera, I, 342, I described a genus of Dolichopodidæ under the name *Phylarchus*. Not having the current numbers of the Zoological Record at hand, I did not know that Simon had used the name for a spider in 1888. My fly of course cannot maintain her ground before a spider, hence I propose the genus PROARCHUS to replace *Phylarchus* for the fly.

In some notes on *Scellus* (Ent. News, XVIII, 135), I stated that I had collected *Scellus vigil* on trunks of trees. The statement was made from memory, and I now believe that I never collected it except on walls of the University buildings at Moscow, *filiferus* being the one that frequents pine trunks in this region. Thus my observations correspond entirely with Osten Sacken's.

In CANADIAN ENTOMOLOGIST, XXXVI, 46, I undertook to determine what name should be used in the place of *Psilopus* of authors, which has

been asserted for a generation or two to be preoccupied. I am glad, indeed, to learn (Sherborn's Index Animalium, quoted by Bezzi, Wien. Ent. Zeit., XXVI, 53), that the use of the term *Psilopus* by Poli in Mollusca in 1795 was not in a nomenclatural sense, and hence does not constitute a pre-occupation of the name, which should therefore stand for the dipterous genus.

WISCONSIN BEES — NEW AND LITTLE-KNOWN SPECIES.

BY S. GRÄNICH, PUBLIC MUSEUM, MILWAUKEE.

Perdita F. Smith.

In the eastern part of Wisconsin this genus is poorly represented. In the region around Milwaukee only two species have been met with so far, one of these *P. maura* Ckll., and the other a new species described below. Along the St. Croix River, in the north-western corner of the State, three species were obtained (Milw. Publ. Mus. coll. exped.), two of which are new, while the third, *P. Bruneri* Ckll., had up to the present time not been found farther east than Nebraska. It is more than probable that careful collecting along the western border of Wisconsin will add some more species of *Perdita* to the bee fauna of our State.

Perdita pallidipennis, n. sp.

Female.—Length about 8 mm. This is a third member of the *albipennis-lacteipennis* group. Head and thorax blue-green. Front and vertex dull, face, thorax and abdomen shining. Mandibles curved as in *albipennis*, with reddish tips. On the clypeus a yellow spot on each side in addition to the cuneate-yellow median line. Adjoining the clypeus a yellow mark on each side of the face. Scape in front, a line on prothorax, and tubercles yellow. Flagellum black, a trace of reddish near the tip. Legs dark, with no yellow markings, except on the knees of front and middle legs. Tegulae yellowish on the upper half, brown below. Wings white, nervures and stigma pale. Abdomen black, usually lighter on the apical depressions of the segments. On the first segment a small yellow dot on each side, situated on the margin. A subbasal yellow band, narrowed medially, on each of the four succeeding segments, interrupted on segments 2, 3 and 4, or at least on 2 and 3. Pygidium dark brown, shining. Pubescence of vertex and mesonotum yellowish and erect, long on the vertex, short on the mesonotum. On cheeks and pleurae the hairs are white and long, those on the legs of a dirty-yellow colour.

April, 1910

Male.—Slightly smaller than the female. Pubescence white all over. No median yellow line on the clypeus, and the lateral marks are smaller than in the female. These are connected with each other by a yellow line along the apical border of the clypeus. The lateral face marks are small, the yellow line on the scape is inconspicuous or nearly absent, and the same is true of the yellow line on the prothorax. No yellow on tubercles. Legs coloured as in the female. Yellow of the abdomen confined to a small lateral spot on each side of the second segment, situated on the margin, and similar, exceedingly small spots on the margins of the third segment, and rarely of the first as well. Pygidium reddish yellow.

Types : Mouth of Yellow River, Burnett Co., Wis., July 28-31. 1909. (Nos. 31730 and 31731.)

Paratypes : One male, mouth of Yellow River, July 28-31, 1909 ; four males and two females, Kettle River Rapids, Aug. 4, 1909, and one male, Randall, Aug. 5, 1909, all of these localities in Burnett Co. along the St. Croix River. Specimens in the collection of the Milw. Publ. Museum. They were taken on the flowers of *Rudbeckia hirta* and *Helianthus occidentalis*. This species is distinct from *P. albipennis* Cr., and *P. lacteipennis* Swenk & Cockerell, one of its main characters being dark legs with a trace of yellow around the knees only.

Perdita maculipennis, n. sp.

Female.—Length 6 to 7 mm. Head and thorax dark green, legs and abdomen brownish-black with yellow markings. Body clothed with white pubescence, longest on legs and tip of abdomen. Wings white, with a conspicuous black dot in the stigma.

Head broader than long. Flagellum black above, reddish-yellow below. Scape light yellow in front. Clypeus yellow with two longitudinal black bars, not reaching the apex. Lateral yellow face-marks triangular, running half way up the face. Apex of triangle rounded or truncate, the base often emarginate. These face-marks are very variable ; in one specimen on one side of the face a division into two small spots is noticeable. Mandibles yellow, with reddish tips. Tubercles, tegulae and two spots on prothorax yellow. The metathorax has a more bluish tinge than the rest of the thorax. Abdomen with two yellow spots on the first and interrupted yellow cross bands on the anterior half of the second, third, and fourth segments. The spots on the first segment may be absent, and the bands on the remaining segments may be so widely interrupted as to form small spots only. Pygidium reddish. In front and middle legs, tips of femora,

anterior surfaces of tibiæ and metatarsi yellow. Hind legs without distinct yellow markings. Wings milky-white, with pale veins and stigma. An oval black spot in the stigma takes up the greater part of its area, leaving only a portion of the base, and a narrow strip along the costa unoccupied.

Type taken August 13, 1905, at Milwaukee, Wis., flying around its nest in sandy soil. (No. 31740.)

Fourteen paratypes, Aug. 6 and 13, 1905, and June 30, 1906, from the same locality, all of them obtained in the vicinity of their nests.

This species is easily recognized on account of the black spot in the stigma, a character which it has in common with *P. maculigera* Ckll., but the latter is a yellow insect with dark markings, while in *maculipennis* the dark predominates.

Perdita citrinella, n. sp.

Female.—Length about 6 mm. Pale lemon-yellow with a greenish tinge in the metathoracic region, and black marks which are distributed as follows: Ocelli, a spot, usually diamond-shaped on each side of the front, situated half-way between the upper ocellus and the base of the antennæ; between this spot and the eye a narrow line extending to a point opposite the base of the antennæ; a large spot on the thorax underneath, occupying the area between the anterior and middle coxæ (mesosternum) and a smaller spot in front of this (prosternum), both spots reaching the pleural region; on the margin of the second abdominal segment a short slender line; on the anterior surface of each femur a conspicuous shining longitudinal band. These markings are more or less developed in all of the specimens, and in addition to these some specimens show a dark coloration of the sutures of the face and thorax, a black spot on the hind surfaces of the hind tibiæ near the tip, black hind tarsi, and narrow black apical bands across the abdominal segments, dorsally as also ventrally. In the latter case the bands are more in the basal region of the segments. There may be also two or more minute black dots on the clypeus. Antennæ reddish below, black above. Mandibles yellow, with reddish or brownish tips. Pygidium reddish-brown. Wings white, with light veins and stigma. Soft white pubescence on legs, lower part of thorax and apex of abdomen, moderately close on legs, otherwise sparse.

Type: August 13, 1909, North Hudson, St. Croix Co., Wis. (No. 30389.)

Six paratypes, Aug. 13 and 14, 1909, at the same locality. Type and paratypes in the collection of the Milw. Publ. Museum.

This bee collects pollen from the flowers of *Petalostemum villosum* (*Leguminosæ*). There are two western species, *P. perpallida* Ckll., and *P. zootonæ* Ckll., which are evidently extremely close to *P. citrinella*, but which collect pollen from different plants. The three seem to be very unstable in their colour characters, they have probably originated from the same ancestral form within comparatively recent times, and the fact that they visit different flowers in the regions where they have been observed, so far, does not exclude the possibility of their belonging to one species only. *Halictoides Novæ-angliæ* for example obtains pollen at Waldoboro, Maine, from the flowers of *Pontederia cordata* only, as reported by Mr. John H. Lovell (*Psyche* XIII, p. 112), at Milwaukee and at Cedar Lake, Washington Co., Wis. (about 30 miles north-west of Milwaukee). I have never seen it collecting pollen from the flowers of any other plant but *Monarda fistulosa*, and in Burnett Co. in the north-western part of Wisconsin I repeatedly saw it visiting the flowers of *Agastache feniculum* for the same purpose.

(To be continued.)

A CORRECTION.

In the January number of the CANADIAN ENTOMOLOGIST, p. 8, the late Mr. G. W. Kirkaldy corrected some preoccupied generic names in insects. Among these he proposed *Americides* for *Dryope* Ch., the latter name being preoccupied in Diptera and Crustacea. However, Mr. Karl R. Coolidge had already proposed *Dryoperia* for *Dryope* Chamb. See *Entomological News*, Vol. XX, p. 112.—W. G. DIETZ.

Esperanto, the international language, if it has not done so before, has at last invaded the entomological field. Mr. Tor Helliesen, of the Museum in Stavanger, Norway, has just published a list of Coleoptera new to that country, and has added a resumé in Esperanto.—H. S. SAUNDERS.

SYNONYMICAL AND OTHER NOTES ON COLEOPTERA.

BY THOS L. CASEY, WASHINGTON, D. C.

The fact that some important catalogues of the Coleoptera of the world are about to be published, renders it desirable to afford all the aid possible to the compilers of these lists, by making known such apparent synonymy relating to published species, as may have come to light since their appearance in the literature of the subject. The writer has therefore endeavoured to do his part, as far as the course now seems clear and evident to him, in the following notes.

The recent catalogue of the Staphylinid genera by Dr. Eichelbaum (Mem. Soc. Ent. Belg., XVII) is a very welcome summary, although personally, my position is undesirably conspicuous in regard to the number of generic names proposed, and I had hoped to be overshadowed in this respect by some other specialists in the family. A reduction of the number ascribed to the writer is therefore in order, although some already reduced to synonymy, such as *Eumitocerus* Csy., which is a synonym of *Trichophya*, are restored by Dr. Eichelbaum inadvertently, and one, at least, reduced by the compiler, i.e. *Myrmobiota*, will have to be restored to full generic rank, as it has very little to do with *Homœusa*. Dr. Eichelbaum would also have done well to place *Liparocephalus* in the Aleocharinæ near *Phytosus*, which is its true systematic position.

In regard to emendations, the author has been very liberal; but, in my opinion, no generic word should be emended at all. Generic words are not a part of language to any greater extent than the x, y, z of algebra. They are merely pronounceable symbols formed by combinations of letters, although in many cases their derivation, or intended derivation, from certain words, either of classic or barbaric origin, is sufficiently evident. Not being strictly a part of language however, they should be withdrawn from rules of etymology, in order to protect them from possible emendators of diverging views;—that is if stability in the fundamentals of nomenclature is to be maintained. It is highly desirable, and ought to be compulsory, that the generic symbol should have an ending conforming to the Latin language, in order to determine gender in the specific word; but just how such a rule could be enforced is rather difficult to imagine. In the fixing of gender for species names the general Latin rule should be applied, but without those exceptions which always occur in actual

language. The word *Venus*, for example, when used as a generic symbol is merely a combination of letters without meaning, and the species names should be given the masculine ending. So, genera ending in *soma* or *derma* should have the feminine ending in the specific names, without regard to the gender of such words in the Greek. Generic symbols, even if considered a part of language, could not be Greek, but, as soon as taken into the nomenclatorial scheme, become Latin, which should be the sole source of specific words. These species names always have a meaning and therefore assume a different status from generic symbols; they can and should be altered if necessary to give the meaning intended by their author.

Looking through the pages of this catalogue I would propose the following changes :

Hyptioma Csy., p. 162, is a synonym of *Holisus* Erichs.; the species *Cubensis* seems however to be valid. This error in the generic name indicates one of the disadvantages of working without full literature at hand, as the writer has been forced to do on many occasions; but, in this case, although resulting in a synonym, there is a certain advantage in having a perfectly independent estimate of the systematic position of the genus, which seemed to be a Xantholinid and not closely related to the *Cafius* series.

The genera *Terasota* and *Taphrodota*, p. 242, are subdivisions of *Aloconota*.

Euromota, p. 242, and *Anepsiota*, p. 236, are valid subgenera of *Atheta*, as this genus is supposed to be constituted by recent authors. I do not agree with those who place so many heterogeneous elements under the genus *Atheta*, and believe that the ideas expressed in the older catalogue of Heyden, Reitter and Weise are far nearer to the truth. There such names as *Acrotoma*, *Liogluta*, *Aloconota*, *Amischa* and some others, stand for genera in the full sense of the word, each with numerous subgenera.

Macroterma, p. 242, is a valid subgenus of *Atheta* in its comprehensive sense. The species *dentata*, of Bernhauer (*Atheta*), is smaller and narrower than *alutacca* Csy., and the two are not very closely related.

Homalotusa, p. 242, is also a subgenus of *Atheta*, near *Liogluta*.

Elytrusa, p. 235, may or may not be the same as *Megista*, for I am by no means certain that the type is identical with the type of *Megista* Rey; it however is at best a subgenus, very closely allied to *Megista*.

Achromota, p. 254, does not belong to the Aleocharini but to the Myrmedoniini and is a synonym of *Acrotona*.

Eurypronota, p. 235, is a valid subgenus of *Atheta* near *Acrotona*. If the present *Atheta* were properly divided generically, it would be a subgenus of *Acrotona*.

Colposura, p. 236, and *Valenusa*, p. 242, are valid subgenera of *Atheta* near *Amischa*. *Amischa* is really a valid genus, of which the two mentioned might be regarded as subgenera.

Athetota, p. 236, is a synonym of *Anepsiota*.

Platysa, p. 223, is a synonym of *Myrmedonia*. This synonym was announced many years ago, but was overlooked by Dr. Eichelbaum. (See Ann. N. Y. Acad. Sci., VII, p. 322).

Nototaphra, p. 222, has dorsal sexual tuberosities of the male abdomen similar to those of *Myrmæcia*; but it differs in the formation of the sterna between the middle coxæ, in the very fine close punctures of the upper surface and in the smaller basal joint of the antennæ. If *Myrmæcia* be regarded as a subgenus of *Myrmedonia*, *Nototaphra* would be another subgenus; if, however, *Myrmæcia* is a distinct genus, as I hold to be true, then *Nototaphra* is also distinct.

Myrmobiota, p. 250, is a genus wholly distinct from *Homœusa*, and has a markedly different habitus. The specimen sent to Dr. Wasmann by Mr. Wickham under that generic name, and upon which the former gained his opinion of *Myrmobiota*, was certainly *Homœusa* and not *Myrmobiota*. I have never seen this specimen. *Soliusa*, p. 250, might be regarded as a subgenus of *Homœusa*, but its type, *crinitula*, bears not the slightest resemblance to *Myrmobiota*, and has only a general similarity with the type of *Homœusa*. Dr. Eichelbaum should certainly make these corrections in the interest of truth.

The above notes will determine certain points which could not very well be settled, because of the isolated nature of the descriptions. There are, however, many names which I have published as genera in systematic work, such as those under the comprehensive genus *Aleochara* and under *Falagria*, the weight of which as genera or subgenera can be determined very well from the context. Very recent writers will probably be disposed to hold them for the most part as subgenera, but I am sure that more painstaking study would convince them that they are in great part true genera. It can only be said that for the present their systematic weight is a subject of disagreement.

Some years ago, in the CANADIAN ENTOMOLOGIST, I explained that the generic name *Delius* Fauv., p. 194 (Rev. d'Ent., 1899, p. 11), is preoccupied by *Delius* Csy., in the Scydmaenidæ (Ann. N. Y. Acad. Sci., 1897, p. 497); as no substitution has been made for the Fauvelian name, I would propose *Deliodes* (nom. nov.) for the *Delius* of Fauvel.

The following are some additional synonymic notes on the Staphylinidæ:

The *Ocyusa asperula* Csy., (Ann. N. Y. Acad. Sci., 1893, p. 305) appears to have been redescribed by Dr. Bernhauer under the name *brevipennis*.

Aleochara Kansana Csy., (Tr. Acad. Sci., St. Louis, 1906, p. 141) is a synonym of *ellipsicollis* Csy. (l.c., p. 142).

After *Baryodma castaneipennis* (l.c., p. 152) read Mann., instead of "Esch."

The name *Baryodma densiventris* Csy., (l.c., p. 158) is preoccupied by Bernhauer, and I would therefore substitute for it the name *Humboldti* (nom. nov.).

Eucharina rugosa Csy., (l.c., p. 166) may be regarded as a synonym of *sulcicollis* Mann.

Echiochara lucifuga Csy., (l.c., p. 177) originally placed in *Rheochara* (Ann. N. Y. Acad. Sci., 1893, p. 288) was redescribed by Garman (Psyche, 1894, p. 81) under the name *Calodera cavicola*.

The subgeneric name *Tachysilla* Csy., (l.c., p. 213) is a synonym of *Caliusa* Rey.

Lissagria minuscula Csy., (l.c., p. 254) is a subspecies of *robusta* Csy.

Falagriota lucida Csy., (l.c., p. 257) is a synonym of *occidua* Csy.

After *Gyrophæna flavicornis*, (l.c., p. 291) for "n. sp." read Mels.

Homalotusa pallida (l.c., p. 342) is a synonym of *fuscula* Csy.

In the latest European catalogue of Heyden, Reitter and Weise, the genus which I called *Eulissus* Mann., (l.c., p. 379), is named *Gauropterus* Thoms.; but in the catalogue of Dr. Richelbaum this decision is reversed, *Gauropterus* being given as a synonym of *Eulissus*. There is some obscure point to be cleared up here, it would seem.

Leptacinus rubricollis Csy., (l.c., p. 400) is preoccupied by Reitter (1899); but, as these names may possibly apply to what might be regarded as a single species, I hesitate to substitute another name at the present time.

Diaulota insolita Csy., (Ann. N. Y. Acad. Sci., VII, 1893, p. 355) is a synonym of *densissima* Csy.

After *Lathrobium amplipenne* (Tr. Acad. St. Louis, XV, p. 81) insert "n. sp."

The substitution of *Astenus* Steph., for *Sunius* Erichs., is one of those rigorous applications of the laws of priority which it is very difficult to adopt with any degree of complacency, because, throughout almost the entire literature of the subject, the genus has been known under the name *Sunius*, and, in this special case, because the word *Astenus* is very misleading if we look at it etymologically. There are some other iconoclastic changes of names, especially in the Pselaphidæ, which seem to be equally unnecessary. I believe fully in the law of priority, but do not think it can be made quite so rigid as the law of gravitation: and, that when a name has become established through very long and extensive usage, in fact universally employed, it should not be changed unless there can be no shadow of doubt as to the necessity for doing so, and of this we should be made aware by the publication, coincidentally with the proposed change, of all the facts and original descriptions which apparently compel it, so that everyone may be enabled to form his own opinion.

The following notes synonymic and otherwise are appended:

SCYDMÆNIDÆ.

Eumicrus cruralis Csy., (Ann. N. Y. Acad., IX, p. 534) is a synonym of *ochreateus* Csy.

COCCINELLIDÆ.

In a paper published recently by the writer (CAN. ENT., XL, p. 393) a few errors and misprints occur which require correction as follows:

On pp. 397, 400 for "*liliputana*" read *lilliputana*.

On p. 399, 19 l. from bottom, for "met-episterna" read met-epimera.

On p. 400, 4 l. from top, for "*parenthesis*" read *apicalis*.

On p. 409, 3 l. from top, for "*cacti*" read *plagiatum*.

On p. 413. The species described under the name *Brachyacantha metator* does not belong to that genus, but is a member of the genus *Hyperaspis*, belonging near *jocosa* and *Levati*, which have a habitus so nearly that of *Brachyacantha* that it did not occur to me to examine the anterior legs.

Scymnus subsimilis Csy., (Journ. N. Y. Ent. Soc., VII, p. 150) is a synonym or slight variety of *aridus* (l.c., p. 146).

Scymnus Calaveras Csy., (l.c., p. 150) may be regarded as a synonym of *tenuivestis* (l.c., p. 151).

BUPRESTIDÆ.

In my recent paper (Proc. Wash. Acad. Sci., XI) on p. 49, line 22 from top, and again on p. 115, line 15 from top, for "*ornata*" read *decora*.

TENEBRIONIDÆ.

Metoponium laticolle and *faustum* Csy., (Proc. Wash. Acad. Sci., IX, pp. 291, 292) are subspecies of *abnorme* Lec.

Metoponium congruens and *anceps* Csy., (l.c., pp. 293, 294) may be regarded as subspecies of *perforatum* Csy.

Metoponium subsimile Csy., (l.c., p. 295) is a subspecies of *socium* Csy.

Steriphanus alutaceus and *peropacus* Csy., (l.c., pp. 348, 349) are probably slight varietal or racial forms of *subopacus* Horn.

Steriphanus unicolor Csy., (l.c., p. 346) is not more than a subspecies of *convexus* Lec.

In describing the elytra of *Bothrotes pertinax* Csy., (l.c., p. 405) it is stated that the impressed lines are wanting except apically; this is a mistake, due probably to inadvertently observing some other specimen, for, in the type of *pertinax*, the impressed lines are very well developed.

Metopoloba contaminans Csy., (l.c., p. 418) is a synonym of *sublæviceps* Csy.

On p. 463 (l.c.), it is stated that my description of *Zopherus Haldemani* is apparently the first full diagnosis to be published, but this is an error, as the species had been satisfactorily described by Horn many years before, under the name *Z. nodulosus*, Sol.

Phlæodes latipennis Csy., (CAN. ENT., 1907) is a synonym of *pustulosus*, Lec.

Additional specimens of *Nesostes robustus* Lec., (Proc. Wash. Acad. Sci., X, p. 59), recently received, show that the elytra are not polished on the apical declivity in all examples, but in some are opaque throughout; evidence seems to indicate that the entirely opaque individuals are males.

The recent paper on *Diplotaxis*, by Mr. Fall (Tr. Am. Ent. Soc.), answers a want long felt in a genus which has been almost as much of an enigma as *Brachynus*, so far as the identification of species is concerned.

The annoyance caused by the numerous, and at times rather obtrusive, misprints, which have come to be somewhat characteristic of its medium of publication, is offset to some extent by the more satisfactory typographic form, the new dress being more becoming than the old. I notice that Mr. Fall makes use of a word *umbone*, to express a protuberance of the surface; this word also occurs frequently in the writings of Dr. Horn and others. On consulting the dictionaries, I find that the word *umbo*, which has been adopted by the English language directly from the Latin, has, for a French equivalent, *umbron* and Italian *umbone*; but it is not quite apparent why we should use the Italian word in preference to the Anglo Latin *umbo*, which is shorter, more rational and less liable to be mistaken for an English singular of the Latin plural *umbones*, if perchance construed as forming two syllables instead of three.

It is also impossible to confirm the correctness of the geographic name "Baboquivaria" used by Mr. Fall and others. The atlases give either Baboquivari or Babuquivari, the latter form in Steiler's Handatlas. The form "Baboquivaria" is only quotable from the pin-labels of our genial and old-time friend Prof. Snow, and was presumably so printed under misapprehension.

It would seem to be almost time that the true value of the synonymical list of my early species published by Dr. Horn, and embodied in the Henshaw List, should have become known to systematists. I drew attention to the unreliability of this list in one of my papers published in the Bulletin of the California Academy, and it would be scarcely worth while to allude to it again, were it not necessary to remark that in blindly following the synonymy indicated by Dr. Horn, the author of the work on *Diptotaxis* has fallen into an error, which he might have avoided had he read my description of *D. levicula*, and not taken it for granted that it was, as stated by Dr. Horn, identical with the *punctata*, of LeConte, inhabiting a different region: for Mr. Fall does not admit that *punctata* occurs in Arizona, and yet places *levicula*, from Arizona, as a synonym of that Texan species. On comparing my type with LeConte's material many years ago, I made up my mind that it was closely related to *carbonata*. A perusal of Mr. Fall's paper indicates that he has redescribed it under the name *rufiola*. This name is therefore in all probability a synonym of *levicula*.

In Mr. Fall's Revision of the Ptinidæ (Tr. Am. Ent. Soc., XXXI, p. 274), the author has apparently strained pretty hard to make a synonym

of my *Cænocara occidens*, and it is almost needless to say that he is in error. *Occidens* is one of the smallest known species of *Cænocara* and is always pale brownish-testaceous in colour. I compared it carefully with the actual type of *Californica* Lec., and the two have no mutual resemblance whatever, *Californica* being much larger and black in colour, as stated by LeConte. The pubescence may have given it a brownish tinge to Mr. Blanchard, but the integuments are black.

In his treatment of my *Ptilinus flavipennis*, in this paper (p. 281), Mr. Fall also displays a decided lack of liberality in the absence of positive knowledge, for it is true beyond any legitimate question, that *Ptilinus flavipennis* is not a synonym of *basalis* Lec., but is a separate and distinct species.

It is seldom that I have attempted to assume the role of critic of the work of my fellows in the field of morphological classification, although frequently being forced to defend my own work from attack, when the motive therefor seemed unjust or the reason ill-founded. Having done so much work himself in this field, the writer feels only too acutely the uncertainty of the results of our labours and of our helplessness in the presence of the undecipherable; for we know not a whit of the meaning or origin of it all. The recent work of Dr. F. E. Blaisdell on the genus *Eleodes* tempts me, however, to make a few observations, which I trust will be taken in good part, as they are given in a spirit wholly friendly to the author and in no way as captious criticism.

This work stands alone in the minute and careful study bestowed upon the subject and in its remarkable array of detail. Its degree of departure from the actual truth, so far as indicating the total number of species and subspecies which the author had before him is concerned, is of course a part of his own individual perceptiveness and methods of reasoning and would be viewed differently by every investigator; no two would probably agree, but I think it can be truly said that Dr. Blaisdell has tried to steer an ultra-conservative course, and that in his inner conscience he really felt that there were many more forms that should be given places in the taxonomic scheme than he quite dared to make known. This can be inferred, at least, from the fact that so many species or subspecies are presented to us under the term "*forma*," which he modestly states are not to be perpetuated in the catalogue but are only intended as convenient

references ; but if he did not think that many of them would be perforce adopted, he could much more simply have stated *forma A*, *forma B* and so on. As a matter of fact, it is these *formas* that have prompted me to write this notice, for it is very difficult to understand how some of them can fail to find their way into the catalogue as legitimate taxonomic units, such for instance as *Farallonicus* under *parvicollis*, *Catalinæ* under *omissus*, *interstitialis* under *carbonarius*, *annectans* under *obsoletus*, *ordinatus* under *pilosus* and in many other similar cases. Indeed it becomes evident that these *formas*, which in many instances have been given perfectly distinctive and proper names, may produce much trouble and confusion, and I would strongly advise the author to issue a supplement in which he definitely states which of them he would have perpetuated as subspecies and which are to be conclusively dropped ; for that they all have the status at least of subspecies cannot for a moment be held in dispute, when we view such conservatism as prompted him to write *porcatus* as a variety of *obsoletus*, or *brunnipes* as a variety of *pimelioides*, instead of giving them their evidently proper status as distinct species.

In this connection it should be stated that *compositus* Csy., is by no means a form of *hispilabris*, as was in fact admitted by the author himself when he viewed the type in my collection, though unfortunately not until after his monograph had appeared in print. It is a wholly distinct and isolated species, not closely related in any way to *hispilabris*, and this remark can be repeated in regard to *elegans* Csy., an isolated species referred by Dr. Blaisdell to *dentipes*, which it does not in the least resemble.

The amount of conscientious work made obvious by the extremely detailed account of the sexual characters, is most unusual in systematic studies of this kind ; but, although a very interesting contribution to morphology, it must be held to be of comparatively little practical utility in determining species ; to even thoroughly understand it, one would be compelled to devote almost as much time to painstaking dissection as that expended by the author himself.

In conclusion there are but two other points which might be alluded to in reluctantly criticising this voluminous monograph, the first relating to the title, which is so lengthy as to be objectionable to the bibliographers ; it is a mistake to try to describe the scope of a paper so minutely in the title itself. The second relates to the gender given the specific names,

- which, to follow the general rule for genera ending in *odes*, should be masculine and not feminine.*

ON SOME NEW SPECIES OF BALANININI, TYCHIINI AND RELATED TRIBES.

BY THOS. L. CASEY, WASHINGTON, D. C.

A recent rearrangement of my somewhat extensive material in the genus *Balaninus*, shows that we have been misinterpreting the species described by Say under the name *rectus*, which, as identified in most cabinets, is of slender form, with a thin and strongly arcuate rostrum, very abundant in Arizona, and, as represented by closely allied species, extending as far to the eastward as the Atlantic seaboard. The description of Say shows that the true *rectus* has a long and almost perfectly straight rostrum, bent downward only at tip. Two specimens from West Virginia before me undoubtedly represent this species, which is not at all closely related to the form which we have been calling *rectus*, but is more nearly allied to *quercus*. A desire to rectify this very radical error is the principal reason for publishing the following short study, in which quite a number of other species, hitherto undescribed, are also made known. A few Tychiini and related forms, believed to be new, are appended, in addition. Measurements exclude the rostrum, the length of the latter being the distance from the tip to the eyes in a straight line, or a chord of the arc.

Tribe BALANININI.

Balaninus Germ.

A—Rostrum (♀) much longer than the body.

*First funicular joint shorter than the second.

B. hariolus n. sp.—Body slender, dark rufo-piceous throughout, the prothorax blackish; vestiture tawny-yellow, more hair-like and sparser at each side of the median line and on the flanks of the prothorax, rather

*Since this was written Dr. Blaisdell has published (Ent. News, 1910, p. 60) some additional notes on *Eleodes*, in which my suggestion given above has been carried out to some extent, four of his *formas* being given permanent rank as varieties. He seems however to be just a little hazy in his ideas concerning priority, stating that *nitidus* Csy., published many years ago, is a variety of *amplus* Blaisd., published in his monograph of 1909. The species name is of course *nitidus*, *amplus* becoming a variety of *nitidus* and not a species, if that be the true relationship between them. I may also add that there is no close relationship whatever between *dentipes* and *subcylindricus*, and the latter is clearly a distinct species.

faintly mottled with pale brown on the elytra; beak (♂) curved downward beyond the middle, rather stout, gradually thicker basally; prothorax rather longer than wide, moderately narrowed at apex, finely, very densely punctate throughout; scutellum narrow, densely pubescent, pale brown; elytra three-fifths longer than wide, somewhat strongly narrowed from the moderately prominent humeri to the apex, the apices individually rounded; striae but little more than a fourth as wide as the flat intervals, strongly and very closely punctate at the bottom, the intervals finely, closely punctate; fifth male ventral feebly impressed, with the apex moderately sinuate and briefly, sinuately beveled. Length, ♂, 8.0-8.5 mm.; width, 3.2-3.8 mm.; Length of rostrum, ♂, 5.4 mm. Types without locality-label, but probably from Indiana.

Resembles *caryatrypes* Boh., as usually identified in our collections, but smaller, less stout and more acuminate, with slightly coarser elytral striae, much shorter legs and shorter beak; in the species mentioned the fifth ventral of the male is truncate medially at tip.

B. cylindricollis n. sp.—Moderately slender, piceous-black throughout the body and beak, the legs slightly paler; vestiture dense, almost uniform in colour and pale gray; beak (♀) rather thick but almost filiform, but little thickened basally, straight, becoming very gradually and extremely feebly bent beyond the middle; prothorax much longer than wide, scarcely three-fourths as wide as the elytra, parallel, very moderately narrowed apically, densely punctate; scutellum concolorous; elytra one-half longer than wide, the oblique sides arcuate; apices each rounded, the humeri well exposed, rounded; striae about a fourth as wide as the intervals, with the punctures moderate, each bearing a pale scale, the intervals not quite flat, very finely, not very densely punctate. Length, ♀, 7.5 mm.; width, 3.0 mm.; length of rostrum, ♀, 9.4 mm. Tennessee.

Differs from the female of *caryatrypes* in its much smaller size, more slender form, uniform vestiture, shorter and nearly straight beak, apically unrestricted prothorax and in general facies to a very striking degree.

**First funicular joint longer than the second except in cuneatus.*

†*Beak extremely slender, filiform, not at all enlarged basally, the antennae (♂) inserted behind the middle; pygidium (♂) excavated.*

B. cuneatus n. sp.—Form moderately stout, piceous-black, the beak and legs dark testaceous; antennae long and very slender, the first and second funicular joints long and as nearly as discernible perfectly equal in length, each a little shorter than the third and fourth combined;

prothorax fully two-fifths wider than long, parallel basally, strongly and obliquely narrowed in apical half, densely, rather finely punctate throughout, the yellowish-brown vestiture somewhat close but in great part coarsely hair-like; elytra about one-half longer than wide, cuneiform, with arcuate sides, rather prominent humeri, somewhat fine, punctured striae and wide, flat and closely but not deeply punctate intervals, the vestiture of elongate scales dense, yellowish gray, with irregular mottling of pale brown, more distinct than in *quercus*, wholly concealing the surface. Length, ♂, 8.8 mm.; width, 3.8 mm. West Virginia.

A little stouter than *quercus*, to which it is allied, and with the beak about similar in length and curvature, but differing in the very long and perfectly equal first two funicular joints, and in the denser and more squamiform vestiture of the elytra.

The following is a subspecies of *quercus*:

B. sparsellus n. subsp.—Nearly similar throughout to *quercus*, but with the elytra more cuneiform, more elongate and more gradually acute behind, and with the second funicular joint (♂) but little shorter than the first. Length, ♂, 8.5 mm.; width, 3.6 mm. New Jersey.

In *quercus* the elytra are less elongate, more rounded at the sides, more obtuse at apex and with the first funicular joint in both sexes very much longer than the second. The elytral vestiture does not fully conceal the surface. *Quercus* is abundant from Massachusetts to West Virginia.

B. rectus Say.—Somewhat larger and more elongate than *quercus*, blackish, the elytra, legs and beak red-brown; vestiture pale brownish-yellow, in the form of very stout subsquamiform hairs but much more elongate than in *quercus*, similarly in condensed patches on the elytra, elsewhere darker and sparse, not concealing the surface; beak (♀) very long, slender, perfectly straight to within a short distance of the apex where it is bent downward; antennae very slender, the first funicular joint much longer than the second; prothorax about a third wider than long, the sides subangulate at the middle, thence slightly diverging (not parallel as in *quercus*) to the base and strongly sinuately converging to the apex; punctures dense, deep and rather coarse, the median line narrowly impunctate; elytra as in *quercus* but with less fine and more coarsely punctured striae, and less closely, asperulately punctulate intervals. Length, ♀, 9.2–9.4 mm.; width, 3.9 mm; length of rostrum, ♀, 10.5–11.0 mm. West Virginia.

Differs from *quercus* in its relatively longer, in great part perfectly straight, beak, longer pubescence, form of the prothorax and in other characters; from *orthorhynchus* Chit, it may be known at once by its very much larger size, being of three or four times the bulk. One of the two specimens before me has the singular thread-like ovipositor, with its biungulate clasping extremity, protruded as described by Dr. Horn (Proc. Ann. Phil. Soc., XIII, p. 457).

†† *Beak very slender though slightly thicker basally; antennæ (♂) inserted at or slightly beyond the middle; pygidium (♂) not excavated.*

The following species have a narrow elongate fusiform outline, with the prothorax less markedly narrower than the elytra than usual, and are all much smaller and more slender than *caryæ* Horn, which belongs to the same section as defined above.

B. auriger n. sp.—Moderately slender, convex, piceous-black to dark testaceous, densely clothed with narrow pale golden scales, denser in two pronotal vittæ and having a bright lustre in the condensed subtransverse elytral maculæ, of which one, especially conspicuous, is generally well-defined behind the middle, the darker areas clothed sparsely with dark hair-like vestiture; antennæ (♂) inserted at about the middle of the beak, (♀) at just behind basal third, the first funicular joint much longer than the second; prothorax nearly as long as wide, parallel, moderately narrowed apically, strongly, densely punctate; scutellum small, with the elongate central elevation solidly squamose; elytra about one-half longer than wide, rather acuminate, the humeri broadly rounded and not prominent, the striæ moderately coarse and coarsely punctate, the intervals strongly, rugosely punctate. Male with the third ventral at base much below (viewed ventrally) the level of the second,—a very frequent character not generally referred to, the fifth subconcavely flattened, sparsely clothed, the apex broadly and feebly sinuate. Length, ♂, ♀, 5.6–7.0 mm.; width, 2.5–3.0 mm.; length of rostrum, ♂, 3.0–3.4 mm.; ♀, 6.0–8.0 mm. Arizona.

This species typifies a group, no one of which has as yet been described, most of them having been referred to *rectus* Say. The strongly arcuate beak in both sexes, becoming straight only in about basal half, will however alone prevent them from coming under that designation; the femora are strongly toothed beneath in the female but much more feebly in the male. The following seems to be a subspecies of *auriger*:

B. mollis n. subsp.—Smaller than the smallest of a very large series of the preceding, resembling it in general characters, but with the antennæ inserted evidently beyond the middle of the very short beak, the second funicular joint relatively shorter and only a little longer than the third, the prothorax smaller, shorter and more finely punctate and the elytral striæ very coarse, fully half as wide as the intervals. Length, ♂, 4.9 mm.; width, 1.9 mm.; length of rostrum, 2.4 mm.

The single type is without locality label, but is probably from Arizona.

B. strigosus, n. sp.—Form and coloration nearly as in *auriger* but rather shorter, the vestiture nearly similar; beak (♀) shorter, similarly arcuate, not very evidently longer than the body, the antennæ shorter, with stouter club; prothorax nearly as long as wide, more gradually though slightly narrowing anteriorly, with the basal angles more obtuse, the punctures a little smaller and less densely placed, and with a strikingly broad smooth impunctate median line, which is two or three times as wide as the fine impunctate line of *auriger*, though likewise not extending much before the middle; elytra more abbreviated than in *auriger* but similar in general form and sculpture, not about twice as long as the prothorax as in that species, but much less. Length, ♀, 5.2 mm.; width, 2.2 mm.; length of rostrum, ♀, 4.8 mm. Arizona.

The legs are shorter than in *auriger*, especially the femoral peduncle.

B. algonquinus n. sp.—Form somewhat as in *auriger* but shorter and stouter, the type pale brownish-testaceous in colour throughout; beak (♂) stout, strongly arcuate, the antennæ inserted at the middle, the first three funicular joints decreasing uniformly and rapidly in length; prothorax of the same general form as in *auriger*, not quite as long as wide, the parallel sides gradually rounding and converging before the middle, the punctures smaller, close but not crowded, the pale vittæ narrow; scutellum short, solidly squamose on the elevated part; elytra rapidly cuneiform, with arcuate sides and distinct humeri, much less than one-half longer than wide and not twice as long as the prothorax, the condensations of pale fulvous scales numerous and indefinite, the striæ less than half as wide as the intervals, the latter finely and sparsely punctate, only slightly rugulose. Length, ♂, 6.0 mm.; width, 2.7 mm.; length of rostrum, ♂, 3.0 mm. Indiana.

The fifth ventral of the male is feebly impressed and scantily clad, gradually feebly deflexed apically, the apex feebly sinuate, the cleft between

the second and third segments very large. This species may be distinguished from any other of the eastern forms of this group by its shorter and relatively stouter form.

B. acuminatus n. sp.—General form, sculpture and vestiture nearly as in *auriger* but larger and rather more elongate, black, the elytra, legs and beak but little paler; beak (♀) much longer, similarly strongly arcuate, becoming straight in about basal half, the antennæ inserted at basal fourth, the first funicular joint longer than in *auriger*, fully as long as the next two combined; prothorax more elongate, apparently a little longer than wide, slightly but very gradually narrowed anteriorly, closely, strongly and deeply but not confluent punctate, the smooth median line narrow; scutellum similar; elytra with the humeri more prominent and the sides thence more rapidly converging and very feebly arcuate to the rather more acuminate tip, similarly punctato-striate but with the broad intervals much more finely, sparsely and less rugosely punctate, the condensed subtransverse maculæ of pale tawny scales having the metallic glint of *auriger* much less evident; fifth ventral more obtuse and more concave than in the female of that form. Length, ♀, 7.5 mm.; width, 3.2 mm.; length of rostrum, ♀, 9.8 mm.

A single female probably taken in Arizona or Colorado, readily distinguishable from *auriger* by its much longer beak, more elongate prothorax and different fifth ventral of the female.

B. setosicornis n. sp.—Form and vestiture nearly as in *auriger* though slightly less elongate, black or blackish in colour, the beak a little paler, arcuate as in that species, the antennæ (♂) inserted at the middle, (♀) at or slightly behind basal fourth, slender, similar in structure, the bristling black setæ at the apical part of the funicular joints unusually conspicuous; prothorax nearly as long as wide, gradually narrowed anteriorly from slightly behind the middle (♀), or more prominently rounded at the sides and narrowed from before the middle (♂), closely, deeply punctured but much less coarsely than in *auriger*, the smooth median line very narrow; scutellum similar; elytra nearly similar in form, sculpture and vestiture. Length, ♂, ♀, 6.2–6.5 mm.; width, 2.6 mm.; length of rostrum, ♂, 3.0 mm.; ♀, 7.0 mm. West Virginia.

The fifth ventral in the male is flattened medially, subglabrous posteriorly, where there is, on each side of the apex, a dense tuft of hairs, the two patches nearly contiguous medially; in the female the fifth ventral

is feebly, transversely concave and sparsely clothed throughout the length and not scarcely at all modified, as it is in *auriger*.

B. macilentus n. sp.—Form nearly as in *setosicornis* and *auriger* but more slender, rufo-piceous to blackish, the beak a little paler, the integuments rather more shining, the vestiture similar in distribution but whitish and not yellow; beak similarly arcuate; antennæ nearly similar and inserted at the middle (♂), but in the ♀ inserted further forward than in *setosicornis*, at a little beyond basal fourth, the funicular setæ not so conspicuous; prothorax sculptured as in the preceding species but differing more sexually, apparently longer than wide and very gradually narrowed anteriorly from the middle (♀), or more abruptly from before the middle and shorter than wide (♂); elytra with slightly more prominent humeri and more rapidly, obliquely narrowed thence to the tip, with feebly arcuate sides, the apex very acute, especially in the female, the sculpture sparser and feebler, more exposed by the scantier vestiture, the strongly punctate striæ similarly nearly half as wide as the intervals. Length, ♂, ♀, 6.0–6.5 mm.; width, 2.3–2.4 mm.; length of rostrum, ♂, 3.0 mm.; ♀, 6.9 mm. West Virginia.

The fifth ventral is more scantily clothed throughout than in the preceding and does not have such conspicuous apical tufts of hair, and, in the female, the scantily-clad feeble concavity is a little narrower. It may be distinguished from *setosicornis* by its much narrower form, looser vestiture and point of antennal insertion in the female.

B. perexilis n. sp.—Similar in general form and vestiture to most of the preceding species but very small and slender, dark in colour, some of the pale yellowish elytral condensations of the vestiture with feeble metallic glint; beak slender, the antennæ inserted a little beyond the middle (♂), or at basal fourth (♀), the funicular joints shorter throughout than in *macilentus*; prothorax similar in the sexes, notably shorter than wide, gradually rounding at the sides and narrowing anteriorly from near the middle, more strongly in the male, the punctures strong and dense; elytra nearly as in *macilentus* but with rather finer striæ; legs notably more slender, the femora less clavate. Length, ♂, ♀, 4.5–4.8 mm.; width, 1.8–2.0 mm.; length of rostrum, ♂, 2.5 mm.; ♀, 4.6 mm. New Jersey.

The fifth ventral of the male is pubescent at tip, with the surface vestiture finer and sparser but not much modified otherwise; on the fifth ventral of the female there is a deep rounded concavity in about apical

half, thus differing from any of the preceding, and the entire abdomen is much more scantily clad than in the male. This is the smallest, or at least by far the slightest, species that we have. The female is the smaller and more slender of the two specimens at hand.

B—*Rostrum* (♀) *not longer, and generally much shorter, than the body.*
a—*Prothorax relatively large in size.*

B. proprius n. sp.—Body short, stout and convex in form, piceous-black, the antennæ paler; vestiture pale gray, variegated on the elytra with large feeble brownish clouds, almost uniform, not very dense and somewhat hair-like on the pronotum and without condensed vittæ, in the form of elongate, moderately dense scales on the elytra, those of the striae punctures pale cinereous and distinct; beak (♀) not longer than the elytra, moderately arcuate throughout, the antennæ inserted scarcely beyond basal fourth, slender, the scape short, the first funicular joint almost as long as the next two combined; prothorax about a fourth wider than long, parallel, the sides becoming strongly oblique in about apical two-fifths, the punctures strong, deep, very densely crowded; scutellum very narrow, elongate, the dense vestiture divided narrowly along the middle; elytra short, not a third longer than wide, not twice as long as the prothorax and two-fifths wider, the humeri well exposed, the sides strongly arcuate; apex obtuse; striae not quite a third as wide as the intervals, the latter shining, not very densely, subrugosely punctate; fifth ventral twice as wide as long, with a small feeble indentation medially toward tip, not differently clothed; femoral teeth strong. Length, ♀, 6.2 mm; width, 3.0 mm.; length of rostrum, ♀, 3.8 mm.

The type represents a species not at all closely allied to any of our other species; it is without locality label but was probably taken in Indiana.

B. timidus n. sp.—Form stout, small in size, convex, piceous, the legs and beak dark testaceous; vestiture elongate-squamiform, very coarsely hair-like on the pronotum, pale brownish-cinereous, rather dense but only feebly and sparsely, subtransversely variegated with pale brown on the elytra; beak (♂) stout, the antennæ inserted just behind the middle, the first funicular joint nearly as long as the next two, the club rather stout; prothorax slightly wider than long, parallel, the sides obliquely, subsinuously converging in apical two-fifths, the punctures strong and close-set; scutellum elongate, densely clothed, the elevated part with

tumescent polished sides; elytra short, a fourth longer than wide, less than twice as long as the prothorax and a third wider, the humeri less than usually exposed, the converging sides arcuate; apex rather obtuse; striæ somewhat more than a third as wide as the intervals, with the squamæ rather narrow; femoral teeth rather strong, acute; fifth ventral flat, trapezoidal, truncate at tip, glabrous at the middle of the tip and with long but not dense hairs laterally at apex. Length, ♂, 4.7 mm.; width, 2.15 mm.; length of rostrum, ♂, 2.5 mm. Texas (Alpine), Wickham.

To be readily known by its short plump form, unusually small size, short legs and other characters mentioned in the description; it is not closely allied to any other of our species.

b—*Prothorax relatively smaller in size.*

This group includes most of the species having short beaks. *Obtus* Bl., *Caseyi* Chit. (= *brevirostris* || Csy.), and *monticola* constitute a peculiar section of the group, having the rostrum very short in both sexes, stout and only a little longer in the female than in the male, the antennæ inserted slightly behind the middle in the former and correspondingly but little beyond the middle in the latter sex. The group contains, besides the *obtus* section, two other minor sections, one having the male beak very short, in fact scarcely half as long as body and having as representative species *confusor* Ham., *baculi* Chit., and the following:

B. Iowensis n. sp.—Body (♂) larger and a little stouter than in *confusor*, similar in colour, sculpture and vestiture, except that the medial scales of the pronotum are less hair-like and the elytral striæ notably finer, the beak (♂) much stouter, with many longitudinal grooves behind the point of antennal insertion, and, as usual, slightly narrowed before that point, very feebly enlarged toward tip; antennæ inserted well beyond the middle, stouter than in *confusor*, the funicular joints two to four diminishing very gradually in length, the second but little longer than the third and much more notably shorter than the first than in *confusor*; prothorax as in that species, a third wider than long and sinuously narrowed anteriorly but relatively a little larger; elytra more obtuse posteriorly; legs longer, the femora strongly and acutely toothed; fifth ventral feebly and not very definitely impressed and not more sparsely clothed medially; pygidial pubescence abruptly limited superiorly. Length, ♂, 7.3 mm.; width, 3.3 mm.; length of rostrum, ♂, 2.6 mm. Iowa (Keokuk).

The elytral maculation of darker pale brown scales is very feebly defined; there is evidence however of the transverse pale band at apical

two-fifths, so generally noticeable in *confusor* and others of this group, and especially conspicuous in *nasicus* Say. The male beak is less arcuate than in *confusor*.

The second of the two minor sections mentioned above is by far the larger; it has the male beak short though always distinctly longer than in the preceding, being apparently more than half as long as the body, though perhaps not so if we measure the chord of the arc; it is exemplified by such species as *uniformis* Lec., and *orthorhynchus* and *Victoriensis*, of Chittenden.

B. Virginicus n. sp.—Form rather stout, convex, dark, the elytra, beak and legs paler and dark testaceous; vestiture dense, squamiform, brown, with two pale pronotal vittæ, the brown patches of the elytra large and irregular to small and tessellatiform; beak in both sexes notably slender, arcuate, moderately except toward base (♀) or strongly, evenly arcuate throughout (♂), not perceptibly enlarged basally, except very feebly at base and not enlarged apically or with larger mandibles in the male; antennæ (♂) inserted just behind the middle, or (♀), just beyond basal fourth, slender, the first funicular joint much longer than the second, the latter much longer than the third (♀), or only just visibly so (♂); prothorax transverse, fully two-fifths wider than long, the sides rather arcuate, becoming gradually oblique but only feebly sinuate anteriorly, the punctures strong and dense, the impunctate median line virtually obsolete; scutellar vestiture finely, longitudinally parted; elytra of the usual cuneate form, with arcuate sides and exposed humeri, the striæ moderate, rather coarser in the male; legs long, the femoral peduncle long and slender, the teeth large and acute; fifth ventral (♂) but feebly modified, scarcely visibly and indefinitely impressed medially but not more glabrous, trapezoidal, the pygidial pubescence not abruptly delimited superiorly; fifth ventral (♀) broadly ogival. Length, ♂, ♀, 7.2–7.6 mm.; width, 3.2–3.75 mm.; length of rostrum, ♂, 3.6–3.8 mm.; ♀, 5.6–6.1 mm. West Virginia.

It is barely possible that Mr. Chittenden may have included this species with his series representing *pardalis* (Proc. Ent. Soc. Wash., X, p. 24); but it differs from *pardalis* in three important particulars, judging from the description: the legs are longer, the beak in the female is relatively much longer and it is not sensibly enlarged at tip in either sex. There are some palpable misprints in Mr. Chittenden's description, viz.: Page 25, line 4, for apical read basal, and, line 5, for "longer than wide," read wider than long.

B. auctus n. sp.—More elongate than the two preceding, the body deep black, the beak blackish, gradually testaceous apically; vestiture brown and coarsely hair-like on the pronotum, the entire flanks squamose, the scales pale yellowish; elytra with moderately dense and very slender brown hair-like scales, sparsely variegated with small and feebly defined condensations of pale yellowish scales; beak (♂) moderately stout, arcuate beyond the middle, thinner beyond the antennæ, the first four funicular joints decreasing almost uniformly and rather rapidly in length; prothorax fully a fifth wider than long, parallel, obliquely and rapidly narrowed before the middle, strongly, deeply and very closely punctate, the smooth median line extremely narrow; scutellum with the dense vestiture finely parted along the middle; elytra more elongate, cuneiform, one-half longer than wide, rather acuminate at tip, the sides slightly arcuate, fully twice as long as the prothorax and a third wider, the humeri well exposed; striae fine, scarcely more than a fourth as wide as the intervals, the latter finely, asperulately punctate but not very closely; legs rather long, the femoral teeth large and very acute. Length, ♂, 7.0 mm.; width, 3.0 mm.; length of rostrum, ♂, 3.6 mm. New York (Buffalo).

The trapezoidal fifth ventral segment is not notably modified. This species does not seem to have any very close allies; the prothorax is less constricted apically than in the male of *confusor* or *Iowensis*, which also have much shorter beaks; and the body is narrower and more elongate, with much less transverse prothorax than in the male of *Virginicus*.

The three following species are allied more or less closely to *strictus*; they have the male rostrum shorter than in *Virginicus*, but longer and generally more slender than in *confusor* and *Iowensis*, being similar to *auctus* in this respect, but with the prothorax shorter and more transverse and having anteriorly the oblique sides longer and much more sinuate:

B. ordinatus n. sp.—Rather stout (♂) but only moderately convex, almost black throughout, the beak nearly black, strongly, evenly arcuate, moderately stout, with the antennæ inserted exactly at the middle, slender, the first four funicular joints decreasing uniformly and rather rapidly in length; vestiture elongate-squamiform, rather dense throughout, pale tawny and not definitely variegated with darker tint, as usual rather more hair-like on the pronotum, except laterally; prothorax rather small, somewhat less transverse than in the two following, about a third wider than long, the sides in anterior half strongly converging and sinuate, the punctures strong, very dense, the median line very fine; scutellar crust of scales parted medially; elytra with much exposed and prominent humeri,

cuneiform, less than one-half longer than wide, with arcuate sides, the striae moderately coarse, the intervals with asperulate and rather coarse but separated punctures; fifth ventral but feebly impressed, not much modified; legs moderately long, the peduncle of the anterior femora not very long and rather thick, though longer than in the next species, the teeth large and acute. Length, ♂, 7.2 mm.; width, 3.3 mm.; length of rostrum, ♂, 3.3 mm. Tennessee.

Separable from the next two species by the rather stouter and more arcuate beak, having the antennae inserted exactly at the middle; the beak is gradually feebly tapering and is not sensibly enlarged apically. The length of the rostrum in the male of *confusor* is only about 2.5 mm.

B. Appalachius n. sp.—Not quite so stout as *ordinatus*, but with the prothorax relatively a little larger and more transverse, the colour paler, the beak testaceous, proportionately somewhat longer and more slender and evenly, though somewhat less strongly, arcuate, not enlarged apically, the antennae (♂) inserted evidently beyond the middle, the first four funicular joints decreasing; vestiture slender but squamiform, dense, pale tawny-yellow, variegated with brown on the elytra, pale brown and less squamiform on the median parts of the prothorax, which is rather more than a third wider than long, densely punctate, with the sides before the middle rapidly converging and strongly sinuate, the apex almost sub-tubulate; dense scutellar scales parted narrowly along the middle; elytra nearly as in *ordinatus* but with rather less prominent humeri, the legs similarly rather long and with strong, acute dentition, but with the peduncle of the anterior femora notably short and thick, even shorter than in the preceding; fifth ventral (♂) with median half rather abruptly though feebly impressed and clothed with finer, more transverse hairs. Length, ♂, 6.7–6.8 mm.; width, 3.15 mm.; length of rostrum, ♂, 3.4 mm. West Virginia.

The characters relating to the beak, fifth ventral segment and anterior femora will very readily distinguish this species from *ordinatus*. One of the two types has the brown tint on the elytra greatly predominating, and, in fact, almost uniform throughout.

B. parvicollis n. sp.—Form rather stout, rufo-piceous, the legs and beak dark testaceous; vestiture elongate-squamiform, pale tawny and rather dense, more hair-like and sparser in the brownish irregularly transverse maculations of the elytra; beak (♂) slender, evenly and moderately arcuate, not enlarged apically, the antennae slender, inserted slightly behind

the middle, the second funicular joint shorter than the first, but both proportionately more elongate than in the two preceding species; prothorax small, short, two-fifths to nearly one-half wider than long, the sides rounded medially, subconstricted toward base, strongly, sinuately converging apically; densely punctate; scutellum densely, apparently solidly incrustated with scales; elytra of the same form as in the two preceding, the humeri rather prominent; striae scarcely more than a fourth as wide as the intervals; fifth ventral (♂) not modified, except that the tip is distinctly sinuate; legs rather long, the peduncle of the anterior femora long and slender, the teeth moderately large, very acute. Length, ♂, 5.7-6.2 mm.; width, 2.6-3.0 mm.; length of rostrum, ♂, 3.0-3.5 mm. New Jersey.

This species resembles the New Mexican *strictus* very much but is stouter, and the brown areas of the elytra are more pronounced and clothed more evidently with finer, sparser hair-like scales. *Strictus* is represented by two females.

The two following species belong to the fauna of the western slopes of the Rocky Mountains:

B. Utensis n. sp.—Body stout, rufo-piceous, the legs and beak dark testaceous; vestiture narrowly squamiform, dense, pale brownish-yellow, variegated on the elytra with irregularly transverse dark brown maculation; beak (♂) rather stout, arcuate, straighter basally, not enlarged apically, the antennae slender, inserted slightly beyond the middle, the second funicular joint only just visibly shorter than the first, much longer than the third; prothorax small, fully a third wider than long, the sides straight and parallel, rounding and becoming strongly oblique but not sinuate in apical half, strongly and closely punctate; scutellum narrow, the dense scaly crust finely parted along the middle; elytra large, cuneiform, with arcuate sides, not one-half longer than wide, the humeri prominent and much exposed; striae a third or more as wide as the intervals, which are finely, not densely and simply punctate; fifth ventral (♂) feebly impressed and subglabrous medially toward tip, the sides of the impression notably hairy; legs rather short, the femora stout, strongly toothed, the peduncle of the anterior rather short and thick. Length, ♂, 6.5 mm.; width, 3.15 mm.; length of rostrum, ♂, 3.1 mm. Utah (Provo).

Well distinguished by the rather short stout legs and male sexual characters.

B. tubulatus n. sp.—Form still stouter, more nearly black, the legs and beak testaceous; vestiture dense, of the usual form, yellowish-

cinereous, scarcely at all variegated with darker tint on the elytra; beak (♀) rather slender, perfectly filiform throughout, not enlarged apically, evenly and strongly arcuate throughout, the antennæ inserted slightly behind basal third, slender, the first funicular joint distinctly shorter than the next two combined; prothorax very short and transverse, rather more than one-half wider than long, the sides evenly arcuate, gradually and strongly converging and sinuate before the middle, the apex subtubulate, dull in lustre, the punctures strong and extremely dense; scutellum densely squamose, with a tendency to fine parting along the median line; elytra unusually short, not over a third longer than wide, rather obtusely cuneiform, with arcuate sides, the humeri prominent and much exposed; striæ fine, not more than a fourth as wide as the intervals, which are closely but not coarsely punctate; fifth ventral unmodified, broadly ogival; legs long, the peduncle of the anterior femora rather long and moderately slender. Length, ♀, 7.0 mm.; width, 3.4 mm.; length of rostrum, ♀, 5.0 mm. Utah (Stockton).

While belonging to the *strictus* type, this species differs greatly in its stouter form, relatively shorter elytra, more transverse prothorax and in numerous other features.

Mr. Chittenden (Proc. Ent. Soc. Wash., X, p. 22) definitely states as a fact that the form described by me under the name *occidentis*, is the true *uniformis*, and gives to that which I identified as *uniformis*, the name *baculi*. There is some confusion here; my specimens were identified directly from LeConte's material, and, if memory serves, the type in that collection was labelled "Texas," and was of the *baculi* form, more truly fitting the name *uniformis* than the California variegated specimens. A perfectly similar Texas example has been marked "exactly typical" in my cabinet from the date of this actual comparison. However, I discovered about a year after my description of *occidentis* was published, that *uniformis* was originally recorded by LeConte as Californian, and came to the conclusion at that time that my *occidentis* was perhaps that species, or closely allied thereto, but neglected to publish anything concerning it.* Dr. Horn (Pr. Am. Phil. Soc., 1873, p. 459) confused a number of species under the

*There are several allied species in the Pacific coast region of California; one, represented by the male type of *occidentis*, from Sonoma, being smaller, with shorter, stouter beak and especially much shorter joints of the antennal funicle; the other larger and relatively stouter, from Sta. Clara Co., with longer male beak and antennæ, which might be regarded as the true *uniformis*. There is another closely-allied form, labelled "Colorado," in my cabinet, and still another from Siskiyou, Cal.

name *uniformis*, and the length of the male and female rostra is very erroneously stated as far as *baculi* or *uniformis* Lec. (Chit.) are concerned. The interrelationships of the numerous forms or subspecies of *baculi* have not been worked out as yet; it would be an interesting study for those possessing carefully-selected and abundant material; the same remark can be repeated in regard to forms allied to *Victoriensis*, of which there are several.

Tribe PRIONOMERINI.

Piazorrhinus, Sch.

The markings of *pictus* Lec., are very variable, there being sometimes a large elytral blackish spot, and from this to wholly clear, with three irregular dark bands, each ending laterally in a small whitish spot. The following is allied to *pictus*:

P. thoracicus n. sp.—General form, coloration and vestiture as in *pictus* but slightly narrower, the beak still wider, barely longer than wide, broad and flat; eyes but feebly convex, separated on the front by fully half their own width; prothorax relatively much larger and less transverse, nearly half as long and four-fifths as wide as the elytra, the converging sides from base to apex more arcuate; elytra nearly similar in ornamentation but with the striae much finer. Length, 2.4 mm.; width, 1.3 mm. Florida (Palm Beach).

The eyes in the male of *pictus* are more convex than in the female and very narrowly separated; the conformation in *thoracicus* shows that the type is a female. There is a large patch of loose scaly decumbent pubescence above each eye, the two areas separated along the middle; in *pictus* the front above the eyes is evenly and sparsely clothed throughout. *Pictus* was originally described from a unique taken in Georgia; my examples are from New Jersey and Wisconsin.

Tribe TYCHIINI.

Thysanocnemis, Lec.

There are a considerable number of species in this genus allied to *fraxini* Lec. *Horridula* does not occur in California, the type having been erroneously labelled; it was collected in some numbers by Levetie in Indiana, and I have before me three males and one female; the elytra are more elongate than in *fraxini*, and have a V-shaped whitish band at the suture behind apical fourth; the prothorax is relatively smaller, less transverse and less rounded at the sides, and the beak in the female is much shorter; in *fraxini* the female beak is as long as the head and

prothorax; *horridula* is therefore a valid species. There are a number of other forms, notably three from Iowa and Nebraska, in my collection, which seem to represent species different from *fraxini* and *helvola*; they may be briefly outlined as follows:

T. ocularis n. sp.—Form somewhat as in *horridula* but much smaller and not so stout, testaceous in colour throughout, the elytra paler basally but not definitely clouded or banded, the vestiture ochreous, elongate-squamiform, the intervals with single series of longer suberect squamules; beak (♂) short and thick, the eyes, as in *horridula*, very large, convex and coarsely faceted; prothorax only three-fifths as wide as the elytra, one-half wider than long, arcuately narrowed anteriorly; scutellum longer than wide, acute; elytra two-fifths longer than wide, obtusely rounded behind, the humeri widely exposed, the striæ shallow, moderately coarsely punctate; legs with long sparse hairs within, the anterior tibiæ broadly sinuate within in about apical half; fifth ventral not so large as in *horridula* and not impressed; pygidium rather large, semicircular. Length, ♂, 3.2 mm.; width, 1.4 mm. Nebraska.

Readily distinguishable from *horridula* by the vestiture of the legs and the sexual characters, the fifth ventral in that species being very large and feebly impressed medially.

T. punctata n. sp.—Body somewhat similar in form to *ocularis* but still smaller and more slender, pale ochreo-testaceous throughout, the vestiture similar but sparser; beak (♀) slender, arcuate, nearly as in *horridula*, the eyes smaller than in the male and less convex; prothorax notably small, rather more than one-half wider than long, less parallel than in *ocularis*, trapezoidal, with arcuate sides and having a fine entire impunctate median line; scutellum large, longer than wide, acute; elytra more parallel, obtusely rounded behind, with well-exposed humeri, the striæ more impressed and coarser, with very coarse, deep and close-set punctures. Length, ♀, 2.5 mm; width, 1.2 mm. Iowa.

Distinguishable by its small size, slender form, small prothorax, very coarse stria punctures and the fine entire impunctate pronotal line, the latter being broader and only visible behind the middle in *ocularis*.

T. brevis n. sp.—General form somewhat as in *helvola* but shorter and relatively stouter, obscure testaceous throughout, with rather dense short decumbent vestiture of ochreous scale-like hairs, with only a

moderate number of more erect paler scales posteriorly ; beak (♀) rather long, very slender, arcuate ; prothorax shorter, twice as wide as long, parallel, with arcuate sides, arcuately narrowed and subconstricted apically ; scutellum as wide as long, ogival ; elytra shorter than in any other species, barely visibly longer than wide, parallel, very obtusely rounded behind, with widely-exposed humeri, a third wider than the prothorax ; alternate intervals of slightly greater convexity posteriorly, but only very faintly so anteriorly, the striæ fine and rather finely punctate. Length, ♀, 2.85 mm.; width, 1.3 mm. Nebraska (West Point).

Resembles *helvola* somewhat but shorter, with much more abbreviated elytra and with the alternate intervals not distinctly more convex throughout the length, but only noticeably so posteriorly and less markedly even there; also with the striæ more finely punctate. In the male of *helvola* the beak appears to be radically different from that of the male of the *horridula* type, where it is thick, being very slender, almost as in the female and with the antennæ less anterior ; but the fifth ventral is rather deeply impressed medially and the pygidium remarkably large and conspicuous.

Loceptes n. gen.

Body somewhat as in *Thysanocnemis*, the beak stout, separated from the head by a very feeble transverse impression, squamose, the antennal scape extending to the eyes, which are moderate in size and coarsely faceted, the funicle as in *Thysanocnemis*, the club but little shorter, with the sutures fine ; abdominal sutures straight, deep and distinct, the first very feebly angulate medially ; femora with a moderate acute tooth beneath, the tarsal claws strongly, very acutely toothed internally near the base ; scutellum narrowly elevated, parallel and glabrous.

This genus resembles *Thysanocnemis* in appearance very strongly but may be distinguished readily from it, as well as *Plocetes*, by the characters given. The type is the following :

L. recessus n. sp.—Body somewhat as in *Thysanocnemis graphica*, dark, densely clothed with short and rather broad decumbent pale scales, feebly and irregularly variegated with small blackish areas on the elytra and mingled, on the prothorax and along the elytral intervals, with a few short recurved cinereous setæ ; beak (♂) stout, moderate in length, squamose, the eyes separated on the front by the full width of the beak ; prothorax rather small, wider than long, subparallel and rounded at the sides, constricted apically, strongly, closely but not densely punctate, the scales more hair-like

medially ; elytra slightly longer than wide, parallel, obtusely rounded at tip, the humeri greatly exposed at base ; striæ feebly impressed and coarsely, deeply punctate ; legs short, dark testaceous, the femora feebly banded with sparse whitish slender scales just beyond the middle. Length, 2.5 mm ; width, 1.2 mm. Oklahoma (Atoka), Wickham.

In all the species of *Thysanocnemis* and *Plocetes* the scutellum is triangular, flat and densely squamose ; it is here elevated, narrower and coarsely sculptured but virtually glabrous.

Hamaba n. gen.

The species of this genus have the general structure and facies of *Thysanocnemis*, but are minute in size and have the antennal funicle 6-jointed, though with the basal joint similarly large and stout ; the club shorter, being about as long as the first five funicular joints, 3-jointed, with the sutures all distinct. The scutellum is flat, densely squamose and triangular, the tarsal claws deeply and widely cleft and the femora unarmed. The following is the type :

H. Bahamensis n. sp.—Rather stout, dark, the humeri not paler ; legs and beak more or less pale flavo-testaceous ; beak (♀) not longer than the prothorax, rather stout, tapering beyond the point of antennal insertion, the latter at about the middle ; eyes large, convex, coarsely faceted, narrowly separated on the front ; prothorax small, wider than long, parallel, the sides straight, rounding and converging anteriorly, strongly and densely punctured, the scales whitish at the sides, along the median line and in a transverse medial fascia ; scutellum small, flat, acutely pointed ; elytra slightly longer than wide, parallel, obtusely rounded at apex, the humeri well exposed at base, the striæ not much impressed, strongly, closely punctate, the pale scales forming a wide loose irregular subbasal fascia, produced on the suture toward the scutellum, and, at each side, enclosing a darker spot, also a transverse, strongly trisinate fascia behind the middle, the larger scales along the intervals, on the areas of paler vestiture, narrow and elongate. Length, 1.2–1.5 mm. ; width, 0.5–0.65 mm. Bahama Islands (Eleuthera and Egg Island), Wickham.

The following is allied rather closely but appears to be distinct :

H. dispersa n. sp.—Similar in general coloration and structure to the preceding but relatively stouter, the elytra only just visibly longer than wide, blackish, the much-exposed humeri rufescent, the beak rather longer and very much stouter, with the antennæ inserted much beyond the

middle ; prothorax still smaller and much less transverse, the small slender sparse pale scales whitish at the sides and along the median line ; elytra with coarser, deeper striæ, the fine pale sparse scales forming a large solid subbasal blotch, and, behind the middle, a much straighter narrow fascia, the dispersed scales of the intervals large, broad and much more conspicuous. Length, 1.4 mm.; width, 0.65 mm. Bahama Islands (Eleuthera).

It does not seem at all probable that the type of *dispersa* can be the male of *Bahamensis*; the beak does not seem to differ much sexually in my ample series of the latter.

Tychius Sch.

The Californian species allied to *lineellus* Lec., are rather numerous and well defined ; those in my cabinet at present may be distinguished as follows :

Elytral intervals clothed alternately with cinereous-white and pale brown slender decumbent squamiform hairs, without erect setæ of any kind ; body stouter than in any other allied species, the elytra but little longer than wide, with notably coarse striæ ; prothorax with the strong apical constriction and apical tabulation characterizing all the other species of this group ; beak (♀) only moderately slender, not longer than the head and prothorax. Length, ♀, 4.5-4.7 mm.; width, 1.8-2.1 mm. California (exact locality unrecorded) . . . *lineellus* Lec.

Elytral intervals not alternately paler and darker in vestiture ; body less obese as a rule. 2

2—Elytral striæ as coarse and deep as in *lineellus*, not at all obliterated by the vestiture, which is hair-like, depressed, only moderately dense and cinereous throughout, denser on the sutural interval throughout and on the alternate intervals posteriorly, the umbones rather more prominent than in *lineellus* and the body more elongate in form, the elytra much longer than wide ; beak (♀) a little longer and more slender, nearly straight, with the antennæ inserted at the middle ; shorter and stouter (♂), with the antennæ at apical two-fifths. Length, ♂, ♀, 3.7-4.5 mm.; width, 1.6-1.9 mm. California (without more definite statement of locality) *tacitus* n. sp.

Elytral striæ less coarse, partially concealed by the vestiture 3

3—Body black throughout 4

Body black, the elytra testaceous 6

4—Legs rufescent distally, the antennæ and about apical half of the beak testaceous, the antennal club infuscate; decumbent vestiture moderately

dense, cinereous, nearly even throughout and composed of very slender cinereous parallel scales; beak (♀) rather short and stout, not longer than the prothorax, the latter slightly wider than long, rounded at the sides, strongly and densely punctate; elytra about a fifth longer than wide, the umbones feeble, the humeri moderately exposed basally, rounded. Length, ♀, 3.7 mm.; width, 1.7 mm.

Siskiyou Co. *hesperis* n. sp.

Legs feebly rufescent toward and including the tarsi, the beak black or piceous-black almost throughout; antennæ testaceous, with the club dark 5

5—Form stouter than in *hesperis*, as obese as in *lineellus* but much smaller in size, with shorter prothorax, more ovally-rounded elytral apex, obsolete umbones and less exposed humeri; vestiture nearly as in *hesperis*, uniform throughout, pale cinereous, decidedly dense only on the sutural interval and, as usual, on the scutellum; beak (♀) rather longer than the prothorax, black, with the extreme tip rufescent; prothorax wider than long, parallel, with moderately arcuate sides, convex as usual, with the separate and evenly-distributed scales streaming radially outward from a small spot near the middle of each side, and thence pointing obliquely backward to the median line throughout; elytra only slightly longer than wide. Length, ♀, 3.8 mm; width, 1.8 mm. San Diego *radians* n. sp.

Form less stout but with much denser vestiture than in any other of this group, the elytral striæ almost obliterated; beak (♂) almost as long as in the female, distinctly longer than the prothorax, not at all pale at tip; prothorax almost as long as wide, the vestiture much denser and more squamiform than in any other of the group, without trace of the lateral abnormality of the preceding; elytra distinctly longer than wide, the vestiture dense and whitish along the suture and more feebly on the fifth and seventh intervals at base and near the feeble umbones, elsewhere yellowish; antennæ unusually long and slender. Length, ♂, ♀, 4.0-4.1 mm.; width, 1.8-1.9 mm. San Francisco Co., Mr. Soltau *dilectus* n. sp.

6—Body unusually narrow, elongate-oval, convex; scales very slender, sparse throughout, not very dense even along the suture; beak (♀) black throughout, slender, slightly longer than the prothorax, the latter wider than long, narrowing anteriorly from only a little before the middle, closely and strongly punctate, the vestiture fine; elytra two-fifths longer than wide, narrowing apically from only slightly

behind the middle, evenly oval posteriorly, the intervals coarsely, rugosely punctured; fifth ventral with a rounded feeble impression medially. Length, ♀, 3.7 mm.; width, 1.5 mm. Near San Francisco, Mr. Dunn.....*probus* n. sp.

The *sordidus* type differs greatly from the preceding in the form of the prothorax, obese body and form of the beak in the female, this being much stouter, differing but little from the male beak and having the antennæ inserted far beyond the middle.

T. nimius n. sp.—Larger and stouter than *sordidus*, the dense vestiture of elongate, decumbent and strongly strigose scales similar, not brownish however but cinereous in colour; beak (♂) longer, being as long as the prothorax; punctures of the latter not so densely or polygonally crowded as in *sordidus*, the converging sides less rounded; scutellum larger; elytra nearly similar but broader; pygidium of the male very much larger. Length, ♂, 4.8 mm.; width, 2.4 mm. Iowa.

Much larger and stouter than *sordidus* and with a notably greater development of the pygidium. In all the species of this *sordidus* group, the slender strigose scales of the general surface become very different on and near the scutellum, being there broad, pointed and minutely, densely pubescent or plumulose.

T. Texanus n. sp.—Form more obese than in *sordidus*, the vestiture differing, not only in its cinereous colour, but in being less dense, the scales of the elytra shorter and parallel, not more or less tapering toward their apices as in *sordidus*; scutellum larger, the humeri more broadly exposed basally, though very obliquely rounded; legs deep black, not dark testaceous as they are in *sordidus*, the tibiæ more scaly and less hairy; beak (♀) stout, tapering and feebly arcuate throughout, rather longer than the prothorax. Length, ♀, 4.0 mm.; width, 2.1 mm. Texas (Haw Creek).

Rather smaller and decidedly stouter than *sordidus* and differing in the sparser and shorter vestiture of different colour.

T. Carolinæ n. sp.—Nearly similar to *sordidus* but with the prothorax notably smaller, the sides less rounded and more rapidly converging from the base; vestiture similar, dense, pale ochreous, whiter and more broadly squamiform beneath; scutellum broader, less densely incrustated with scales; elytra relatively more elongate, a fourth longer than wide, the vestiture uniform, not so evidently mingled with isolated glittering scales; dense

hair-like scales of the tibiæ coarser. Length, ♀, 4.0 mm.; width, 2.0 mm. North Carolina (Southern Pines), Manee.

It is of course quite possible that these may be considered subspecies of *sordidus*, but the structural characters involved seem to give them higher value.

The following species is allied to *tectus* Lec., but appears to be amply distinct :

T. languidus n. sp.—Small and slender, convex, extremely densely clothed with rather broad parallel cinereous-white scales, which, on the elytra, virtually conceal the striæ ; beak, antennæ and legs testaceous, the first (♂) rather arcuate, thick and nearly as long as the prothorax, the latter narrow, nearly as long as wide, subparallel basally, the sides obliquely converging anteriorly from rather behind the middle ; elytra almost one-half longer than wide, much wider than the prothorax, hemi-elliptical, the humeri well exposed and rapidly oblique at base ; legs short ; pygidium (♂) well developed. Length, ♂, 2.4 mm.; width, 0.9 mm. Colorado.

Differs from the male of *tectus* in its much smaller size, narrower form, white and not ochreous vestiture, which is composed of broader and even denser scales, relatively much narrower prothorax, with less arcuate sides, and notably shorter and more slender legs.

Paratychius n. subgen.

The type of this subgenus of the genus *Tychius*, is *Tychius prolixus* Csy. The body is moderately large in size, elongate, with the thick squamose beak rapidly tapering beyond the point of antennal insertion, which is far beyond the middle and with the antennal funicle 6 jointed. The tarsi are large, stout and densely squamose. The following is another species of the subgenus :

T. (Paratychius) imbricatus n. sp.—Larger than *prolixus*, elongate, convex, black, the apical smooth part of the beak rufous ; vestiture of the prothorax dense, consisting of narrow lanceolate strigose brown scales, giving place along the median line and on the flanks to broad rounded overlapping whitish scales, of which a few are also scattered among the slender brown squamules, the elytra very densely clothed throughout with large rounded or subquadrate overlapping scales, brown in colour, broadly whitish sublaterally, two rows to each interval, with a single series of slender, closely recurved brown lanceolate squamules along the middle of each interval and a slender hair-like white scale from each stria puncture ;

prothorax about as long as wide, narrower than the elytra, parallel, arcuately narrowed anteriorly, the apex only extremely briefly subtubulate; elytra three-fifths longer than wide, the humeri exposed, laterally prominent and rounded; apex obtuse; striae represented by fine clefts separating the indument. Length, 3.75 mm.; width, 1.4 mm. California (San Diego).

The large scales are of peculiar structure, being thick and apparently excessively minutely and densely puberulent, the hairs so disposed as to give sometimes a minutely and extremely closely strigilate effect.

Microtychius, n. subgen.

In this subgenus of *Tychius*, the structure throughout is nearly as in the preceding, including the 6-jointed antennal funicle, but the body is very much smaller, generally minute in size and the tarsi are small and slender, this being the chief distinctive structural feature. The femora are not denticulate beneath. The type is *Tychius setosus* Lec. A considerable number of new forms have come to light since my revision of them (Ann. N. Y. Acad. Sci., VI, 1892, p. 420—under subgenus IV), and I have arranged these new species in the form of a table as follows:

Species of the *setosus* and *subfasciatus* type, the elytra, except in *erraticus*, having patches of large pale scales, separated by subglabrous areas having only decumbent recurved stout hairs sparsely placed, the elytra, especially posteriorly, bristling with very stiff erect pale spines, generally lanceolate, flattened and frequently with their edges minutely setulose or serrulate. 2

Species of the *variegatus*, *simplex*, *sulcatulus* type, without erect bristles. 1 1

2—Elytra without trace of large rounded scales at any point. Body pale testaceo-ferruginous in colour throughout, rather shining; basal part of the beak and front densely punctate and clothed sparsely with short fine hairs, the occiput scaly, the dorsal surface of the beak with a median glabrous line basally; prothorax nearly as long as wide, slightly narrowed apically, densely, not very coarsely punctate, each puncture with a scale-like decumbent hair, without large scales; elytra much wider than the prothorax, with unimpressed series of coarse punctures, each bearing a slender decumbent pale scale-like hair, with others similar, sparsely placed on the intervals, a single series of moderate suberect recurved spiniform scales also along each of the latter; under surface with broad white scales. Length, 1.3 mm.; width, 0.75 mm. Texas (Alpine), Wickham. *erraticus* n. sp.

Elytra and pronotum with patches of large rounded or oval scales. 3

- 3—Prothorax relatively small in size in both sexes, but little more than half as wide as the elytra, very coarsely, closely and polygonally punctate 4
- Prothorax relatively larger, about two-thirds as wide as the elytra or very nearly 7
- 4.—Prothorax shorter, decidedly transverse, gradually broadening or inflated basally and widest at or very near the base. Body very small and moderately narrow, the elytra parallel; head and beak, except apically, clothed densely with large rounded scales, the antennal club small, slender and without sutures, evenly clothed with closely decumbent pubescence; prothorax much narrower than the elytra, with a dense crust of large rounded pale scales, replaced by slender brown scales at each side of the middle basally; elytra obtusely rounded at apex, two-fifths longer than wide, blackish, very deeply, moderately coarsely sulcate, the humeri well exposed and subtransverse basally; large whitish scales denser laterally and in a rounded ring before the middle; erect setæ long and straight, unusually slender and only moderately numerous. Length, 1.2 mm.; width, 0.6 mm. Texas (Alpine), Wickham.....*puellus*, n. sp.
- Prothorax parallel and broadly rounded at the sides as usual, narrowed and constricted at apex..... 5
- 5—Elytra unusually abbreviated, about a third longer than wide, the erect setæ less numerous and shorter than usual. Beak with a mixture of short and lanceolate and broad scales laterally; the scales broad, dense and uniform on the head and median parts of the beak; prothorax slightly shorter than wide, with a mixture of large, rounded and whitish and slender brown lanceolate scales, the former predominating medially and laterally; elytra parallel, obtusely rounded at apex, with rather widely exposed transverse humeri, the striæ unusually fine, moderately deep, the large pale scales dense along the suture and rather close broadly before the middle; dense scales of the under surface large and white, uniform. Length, 1.05 mm.; width, 0.48 mm. Southern California (without further indication of locality)*atomus* n. sp.
- Elytra less abbreviated, two-fifths to nearly one-half longer than wide, the erect setæ long and very numerous, conspicuous..... 6
- 6—Elytra about two-fifths longer than wide; very small in size, piceorufous, the erect setæ moderately long, finely pointed, not very broad,

the sulci deep and moderately coarse, the large scales rather scattered, but, in more perfect examples, forming a large rounded blotch very slightly before the middle. Length, 1.0-1.2 mm.; width, 0.4-0.55 mm. Arizona and California (Yuma).....*setosus* Lec.

Elytra about one-half longer than wide, the pale erect setæ still more numerous and very conspicuous, long, flattened, squamiform, gradually very sharply pointed or lanceolate, the sulci more concealed by the large, more or less pale scales, which have no very definite pattern of arrangement; pronotal punctures moderately coarse, dense; large scales of the femora very broad in form; eyes moderately coarsely faceted. Length, 1.3 mm.; width, 0.6 mm. Arizona (Tucson).....*echinus* n. sp.

Elytra almost similar in form, though not quite so elongate, the setæ long, white, very numerous and conspicuous, but differing very markedly from those of *echinus* in being more slender, parallel-sided, truncate at their apices and with their side-margins more strongly micro-serrulate, the large pale scales sparser, irregularly more numerous suturally, tending to form a more rounded aggregation submedially as in many other allied species; pronotal punctures very coarse, much larger even than in *echinus*, the eyes more coarsely faceted and the large scales of the femora narrower and more elongate-oval. Length, 1.25 mm.; width, 0.5 mm. Arizona (Tucson). *hystrix* n. sp.

7—Upper surface with large, irregularly distributed pale scales as in the three preceding.....8

Upper surface without an admixture of large pale scales.....10

8—Pronotal punctures rather large and deep but less crowded than usual, preserving their circular outline; elytral sulci very coarse, deep and conspicuous. Body somewhat as in *subfasciatus* but shorter, the pale scales of the elytra less numerous, narrower and more elongate, more closely aggregated near the humeri and umbones and in a large annulus, which is more evidently before the middle than the large spot in *subfasciatus*, the erect setæ long and rather slender, not so short and stout as in that species; humeri well exposed at base. Length, 1.4-1.5 mm.; width, 0.6-0.65 mm. Arizona (near Benson), Dunn.....*vernilis* n. sp.

Pronotal punctures coarse, more crowded and polygonally distorted than in *vernilis*, the elytral sulci much finer and shallower.....9

9—Body unusually stout in form, piceo-rufous, the large pale scales dense almost throughout on the prothorax, large and somewhat elongate, isolated and rather close but subuniform in distribution on the elytra, not aggregated into a large central spot on the latter, though smaller and dense along the suture; erect setæ rather long but only moderately numerous; prothorax two-thirds as wide as the elytra, the humeri moderately exposed at base; antennal club dusky, rather larger than usual, as long as the preceding four joints combined, gradually and very acutely pointed. Length, 1.4 mm.; width, 0.65 mm. Arizona.....*fatuus* n. sp.

Body less stout, convex, similar in colour but with the vestiture wholly cinereous, the pronotum densely clothed with large scales, the shorter and more slender ones not only cinereous, and not as usual dark, but broader than usual; large oval scales of the elytra isolated, denser near the humeri, also closely imbricated and smaller in a single line at each side of the suture, the small slender scales cinereous, broader than usual, the erect setæ not so long or so numerous as in the two preceding; prothorax nearly as long as wide, parallel, with rounded sides, constricted at apex, three-fifths as wide as the elytra; antennal club smaller than in *fatuus*, more slender, pale in colour. Length, 1.35 mm.; width, 0.58 mm. Arizona (Tucson)...*fraterculus* n. sp.

10—Form stout, convex, deep black in colour throughout, the beak distally and legs slightly rufescent; vestiture cinereous throughout, consisting of short and narrow, uniformly distributed and not very close-set scales, which are generally not very closely decumbent, and, along the middle of each stria interval, becoming nearly erect, especially behind, though notably short; beak moderate in length, much more and evenly arcuate, the eyes lenticular but larger than usual, elevated above the general surface at their hind margin and with the facets gradually coarser posteriorly; antennal club moderate; prothorax large, shorter than wide, gradually narrowing anteriorly from about the middle, deeply, closely, punctate; elytra about a fourth longer than wide, rounding behind and obtuse from near the middle, the humeri rounding and moderately exposed; striæ fine and shallow; under surface densely clothed with large whitish scales. Length, 1.45 mm.; width, 0.6 mm. Mexico (Rio Balsas, Guerrero), Wickham.....*grypus* n. sp.

11—Species of the *sulcatus* type, the dorsal surface with large rounded pale to brownish scales, intermingled with the slender hair-like scales.

Body much smaller than in *sulcatulus*, the elytral sulci much less coarse and not so deep, piceous-brown in colour; beak well developed, densely squamose except apically, evidently arcuate; prothorax coarsely, closely punctate, not so long as wide, three-fifths as wide as the elytra, parallel, with rounded sides, constricted and narrowed apically, the large pale scales dense, nearly wanting at each side of the middle basally; elytra two-fifths longer than wide, feebly, arcuately narrowing behind the middle, the apex obtuse; humeri rounded, moderately exposed; pale rounded scales more abundant sublaterally, in a large, feebly marked, subcentral annulus or solid spot, and along the suture, where they are variegated with brown; narrow white scales of the stria punctures more evident than in *sulcatulus*. Length, 1.25-1.3 mm.; width, 0.5-0.55 mm. Utah (St. George), Wickham.....*dulcis* n. sp.

Species of the *simplex* type, having virtually no large rounded scales on the dorsal surface.....12

12—Elytral striæ very coarse.....13

Elytral striæ fine and feeble.....14.

13—Form stout, notably convex, piceo-rufous, the prothorax darker; beak (♀) rather long, much longer than the head and prothorax, clothed basally, as well as the head, densely with rather wide decumbent brown strigose scales, with a few similar white ones interspersed; antennal club small and slender; prothorax almost as long as wide, parallel and nearly straight at the sides, narrowing and constricted apically, convex, coarsely, deeply cribrate, clothed with narrow, dark brown scales, having a few large oval ones intermingled laterally and along the base; elytra fully two-fifths wider than the prothorax, a fourth longer than wide, parallel, obliquely narrowing in apical third, the apex broadly obtuse; humeri rounded; striæ coarse and very coarsely punctate, rather deep suturally, becoming wholly unimpressed and consisting simply of series of large punctures laterally, very much coarser than in *simplex*, the slender scales from the stria punctures much finer; slender brown scales predominating but sparse, with some a little wider and whitish at the scutellum and also on the fifth interval toward the umbro. Length, 1.68 mm.; width, 0.72 mm. Arizona (near Benson), Dunn.....*imbellis* n. sp.

Form nearly similar but smaller in size and nearly black, the legs and beak distally rufescent; head and basal parts of beak densely clothed

with dirty white, stout and strigose scales, the antennal club rather small, with distinct sutures; prothorax relatively larger than in *imbellis*, shorter than wide, narrowing anteriorly though scarcely constricted at apex, convex, coarsely, densely cribrate and with small whitish strigose scales throughout; elytra less than a fourth longer than wide, a third wider than the prothorax, evenly rounded in apical two-fifths, the sulci very coarse, deep and coarsely, deeply punctate throughout, the narrow cinereous scales subevenly distributed throughout, isolated, forming even series on the intervals, becoming recurved and not closely decumbent apically; under surface with the usual crust of large whitish scales. Length, 1.58 mm.; width, 0.62 mm. Arizona (Sta. Rita Mts.), Wickham *porcatus* n. sp.

Form nearly as in *imbellis* but much more abbreviated, blackish-brown; antennal club small; prothorax narrow, nearly as long as wide, strongly constricted at apex, very densely cribrate and clothed densely with closely decumbent but curved strigose scales, intermingled with a good many larger oval scales laterally and basally; elytra shorter than in any other species, only just visibly longer than wide, rounded in apical half, the scales brown, parallel, strigose, close-set in single lines on the intervals but very inconspicuous, intermingled with a few widely scattered white scales, which are however not rounded but parallel and strigose like the others; sulci very coarse and deep, strongly punctured, the intervals convex. Length, 1.65 mm.; width, 0.62 mm. Texas (Del Rio), Wickham. *curtipennis* n. sp.

14—Body moderately stout, convex, piceous-brown; beak well developed, clothed densely above basally with narrow strigose whitish scales, which, on the head, become sparser, brown and hair-like; scape not attaining the base, the club moderate, as long as the four preceding joints; eyes lenticular but larger than usual and slightly elevated posteriorly, the facets, however, not becoming noticeable coarser; prothorax convex, not quite as long as wide, the sides parallel and rounded basally, rounding and strongly converging apically from near the middle, the punctures not very coarse, deep, polygonally crowded, each with a narrow strigose brown scale; elytra nearly a third longer than wide, one-half wider than the prothorax, obtuse behind, plentifully clothed with narrow scales which are brown and whitish intermingled, with a patch of oval whitish scales of different character at

the scutellum. Length, 1.5 mm.; width, 0.6 mm. Mexico (Saltillo and Monterey), Wickham.....*errans* n. sp.

The eyes in many of the Mexican species, and particularly in *grypus*, are somewhat larger than in the American, and differ notably in having their surface raised above the general surface posteriorly and in having their facets gradually smaller anteriorly; there seems to be no other very marked structural difference however. *Sibinioides*, *hispidulus*, *transversus*, *mica* and *inermis* are more or less isolated species, not closely related to anything described above. *Simplex*, from El Paso, Texas, is represented at Tucson, Arizona, by a form which is almost identical but materially smaller in size and with the pronotal punctures less densely crowded, each bearing a slender strigose scale, which is narrower than in the more typical form and more isolated.*

Tribe CIONINI.

Miarus Sch.

The species of this tribe are very abundant in Europe; but thus far the only genera recognized as occurring in America are represented by single species, which are importations in *Nanophyes*, *Cionus* and *Gymnetron*, but indigenous in *Miarus*. *Gymnetron teter* Fab., as written by LeConte, or *tetrum*, as given in the recent European catalogue, is abundant and rather widely diffused in our eastern States; it varies enormously in size. In contradistinction to the other genera of the group, *Miarus* is well represented in America, and our species, as far as known to me, may be described as follows:

Prothorax with the erect sparse hairs extremely long, bristling and conspicuous. Body stout, oblong, convex, deep black throughout, the sparse vestiture hairy and cinereous; beak slender, slightly arcuate, similar in the sexes though a little shorter in the male, longer than the head and prothorax in the female; eyes widely separated; prothorax nearly as wide as the elytra, very strongly narrowed from base to apex, with

*The species described by Mr. Schaeffer (Journ. N. Y. Ent. Soc., 1908, p. 219) under the name *albidus*, evidently belongs to the *sulcatulus-dulcis* type, but is much larger than *dulcis*, and with a different elytral pattern of large scales. Of *T. suturalis* Schf., (l.c., p. 218), I have a small specimen from Alpine, Texas; it would appear to be rather a *Sibinia* than a *Tychius*, though these two genera are not definable very well in the American fauna. It has the outline of the European *Sibinia* and of our own *S. fulva*, and should undoubtedly be associated with the latter species wheresoever they may ultimately be assigned.

arcuate sides, the punctures coarse and separated ; scutellum as usual with an elevated median part, which is clothed densely with short decumbent hair-like scales ; elytra barely a fifth longer than wide, very broadly, obtusely rounded behind, the striæ rather coarse, moderately deep, with coarse and separated punctures, the intervals flat, finely, sparsely punctate and with long erect hairs ; under surface with erect sparse cinereous hairs, shorter, denser and more decumbent on the mesosternal side-pieces. Length, 2.4-2.8 mm.; width, 1.3-1.55 mm. Mexico (near Colonia Garcia, Sierra Madre Mts., Chihuahua ; elev. 7,300 feet), C. H. T. Townsend. *erebus* n. sp.

Prothorax with the erect hairs short, bristling but not very conspicuous . 2

2—Surface lustre feebly bronzed ; sides of the prothorax as usual converging from base to apex but only feebly arcuate. Body ovate, convex, black, clothed with grayish erect hairs ; beak long ; pronotum densely and finely punctate ; elytra shining, with deep and slightly punctured striæ, the intervals nearly flat, rugose and punctulate. Length, 2.0 mm. Texas..... *hispidulus* Lec.

Surface lustre not at all bronzed, the body throughout deep black as usual, the sides of the prothorax converging from base to apex but always strongly arcuate, except in *nanus*..... 3

3—Prothorax strongly transverse, but little less than twice as wide as long ; erect sparse hairs almost pure white, forming single series on the elytral intervals. Body short, stout, oblong-oval, convex ; beak slender, arcuate, moderately long , prothorax slightly though distinctly narrower than the elytra, closely, moderately coarsely punctate, the sparse white hairs much shorter than those of the elytra and subdecumbent ; scutellum densely albido-squamulose ; elytra but very little longer than wide, broadly, obtusely rounded behind, the sides parallel and arcuate ; striæ rather coarse, deep, strongly and closely but only moderately coarsely punctate, the intervals shining, feebly and sparsely punctato-rugose, the erect white hairs stiff and very conspicuous ; under surface densely albido-squamose laterally, except on the abdomen, the scales deeply multifurcate. Length, 1.7-2.0 mm.; width, 1.0-1.25 mm. Kansas..... *consuetus* n. sp.

Prothorax much less transverse, notably less than twice as wide as long, the sparse erect hairs cinereous, less conspicuous on the elytra than in *consuetus* 4

4—Form stout, oval, convex, deep black, without metallic lustre of any kind, the hairs cinereous-gray, short but erect and abundant on the

pronotum, moderately long, sparser, bristling and a little paler on the elytra, interlacing across the suture posteriorly ; sparse scales at the sides of the body beneath plumose ; prothorax two-thirds wider than long, the sides very strongly converging from base to apex and notably arcuate, the punctures rather coarse, very dense ; elytra oblong-oval, slightly longer than wide, much wider than the prothorax, the striæ not very coarse and rather shallow, distinctly but not coarsely punctured, the intervals wide, flat, feebly punctato-rugulose. Length, 2.3 mm.; width, 1.4 mm. Massachusetts *puritanus* n. sp.

Form narrower, more elongate-oval, the prothorax less evidently narrower than the elytra, shorter, nearly three-fourths wider than long, the sides strongly converging throughout and only feebly arcuate, the punctures coarse but rather less crowded, the erect short hairs less abundant ; elytra nearly similar but narrower and with the sparse erect hairs longer, more fulvo-cinereous and less abundant, the striæ much deeper and strongly, though not coarsely, punctate, the intervals narrower, less flat, shining, very finely and rather sparsely punctulate ; vestiture at the sides of the body beneath nearly similar. Length, 1.8 mm ; width, 1.1 mm. Massachusetts (the locality different from that of *puritanus* but unrecorded) *nanus* n. sp.

Form much more elongate-oval than in any other here recorded, convex, black ; beak long and slender, feebly arcuate, much longer than the head and prothorax, with the antennæ inserted but little beyond basal third ; prothorax scarcely one-half wider than long, the converging sides strongly arcuate ; punctures moderately small, dense, the vestiture abundant, dusky-cinereous, short and somewhat inclined ; elytra elongate-oval, nearly a fifth wider than the prothorax, a fifth or sixth longer than wide, the humeral callus moderately prominent, the striæ unusually fine, moderately deep, finely, not closely punctate, the intervals flat, between three and four times as wide as the striæ, shining, sparsely punctate and subrugulose, the erect sparse hairs very stiff but shorter than usual and more dusky cinereous ; sides of the sterna densely squamose, the scales closely decumbent as usual, brownish-cinereous and finely, closely plumulose ; pygidium large, vertical, deeply punctate. Length, 2.35 mm ; width, 1.2 mm. Illinois *Illini* n. sp.

The name *Miarus hispidulus* has been used by Reitter, according to the recent European catalogue, but is preoccupied by LeConte for the above American species.

NOTES ON THE LARVA OF *THYMELICUS GARITA*
REAKIRT.

BY ARTHUR GIBSON, OTTAWA, ONT.

A female of this interesting little butterfly was received from Mr. T. N. Willing, of Regina, Sask. The specimen was captured on July 10th, 1901, and was enclosed in an envelope. It arrived at Ottawa on July 16th, and in the envelope was found one egg, which hatched on the following day, the 17th.

The egg when received was of a creamy-white colour and reticulated ; in shape hemispherical ; head of larva plainly distinguishable.

The following notes were taken by me on the larva :

Stage I.—Length when hatched, 1.75 mm., at first creamy-white ; after feeding the dorsum is a pale sea-green, the venter a pale whitish-green. Head large, round, flat in front, very slightly bilobed ; minutely pitted ; mouth-parts reddish ; ocelli small and black ; down the front of the face there is a triangular blackish irregular indefinite band, somewhat like those of *Smerinthus*, but not nearly so distinct. Body cylindrical, tapering slightly towards anal extremity, which is paler than the rest of the body. A faint whitish subdorsal band is present, also an upper lateral, and another between this and the stigmatal fold ; this latter afterwards becomes indistinct. Body bears short, stout, blunt bristles, which turn over somewhat at the tip. All the feet are concolorous with venter.

On July 23rd there were noticed a thin whitish medio-dorsal line, and also six distinct whitish bands of equal width on either side of the medio-dorsal line. The spiracles are small and brownish ; at this time the body is plump, somewhat arched, falling off rapidly at anal extremity ; the segments are transversely wrinkled. The anal flap bears some whitish bristles of varying lengths.

At the above date the larva stopped feeding, and on the 24th the front segments were swollen. On the morning of the 25th it passed the first moult.

Stage II.—Length, 3.4 mm. Head round in outline, flat in front, pale greenish-white ; a little larger than segment 2 ; slight furrow down centre of face to clypeus ; hairs, or bristles, on face numerous, short and black ; mouth-parts pale brownish ; ocelli small and black. Body cylindrical, plump, tapering to anal extremity. The dorsum falls off abruptly from segment 9 to anal end, giving an arched appearance to the body. Whole body green, almost same shade as grass upon which it is feeding,

April, 1910

viz.: Kentucky Blue Grass (*Poa pratensis* L.), the venter being paler than the dorsum. Bristles on body black and very short. Anal and 2nd segments paler than rest of the body. Segments transversely wrinkled as before, but not so conspicuously. The medio-dorsal line and the six lateral stripes are the same as in the end of last stage, all white. There are in all seven stripes on either side of the medio-dorsal line, including the stigmatal stripe. The space between the medio-dorsal line and the first stripe on either side is wider than the space between the other stripes, and unless examined with a lens this space appears as a wide dorsal band, on account of the medio-dorsal line being inconspicuous, and the white of the stripes on sides giving a whitish appearance to the whole larva. Stigmatal band very wide, with a yellowish tinge. Thoracic feet semi-translucent; prolegs concolorous with venter.

The second moult was passed on August 2nd.

Stage III.—Length, 5.5 mm. The larva in this stage is much the same as it was in Stage II. Head a little paler green than body; ocelli small, black, on a whitish prominence; mouth-parts yellowish; whole surface of head has a roughened appearance and bears minute short black bristles; around the mouth-parts are some slender pale hairs. The stripes on the body on either side of the medio-dorsal line are not so regular in width as in last stage. The 1st and 2nd from medio-dorsal line are much wider than the 3rd, 4th and 5th, (the 2nd being wider than the 1st,) and appear as bands. The 6th and 7th are wide, of about equal width, but the 6th is rather inconspicuous, the 7th, the most conspicuous of all, being of a bright whitish colour. The others are more or less tinged with yellow. The sixth stripe is the stigmatal stripe. Spiracles small, yellowish, ringed with brown and situated in the centre of the 6th, or stigmatal stripe. On segment 12 the spiracle is in the centre of the 5th stripe; on segment 2 on lower edge of the 6th, or stigmatal stripe. The whole body bears short black bristles, as on head. All the feet concolorous with venter; lower half of thoracic feet semi-translucent.

On August 14th the larva moulted for the third time.

Stage IV.—Length, 7 mm. The larva in this stage is about the same as it was in the two previous stages. Head, 1 mm. wide, rounded, uniformly punctate, slightly larger than segment 2, and paler green than skin of body; short bristles as before. The body is shaped as before, the medio-dorsal line and the markings on either side are the same as in last stage, the 2nd stripe being much wider than the 1st, 3rd, 4th and 5th, and

nearly as wide as the stigmatal and 7th band. Spiracles yellowish, ringed with brown. The 7th band is the most conspicuous mark on the body, being distinctly whitish in colour, with a bluish tint. The extremity of the anal flap has a few pale blunt bristles, which protrude straight outwards. All the feet concolorous with the venter, as before.

Unfortunately, on Sept. 13th the larva died. At this date it was only a little longer than the above measurement, viz., 8 mm. long. In view of this it would seem possible that the larva hibernates in this stage. During the above stages it was fed only on Kentucky Blue Grass, (*Poa pratensis* L.)

I have delayed the publication of the above notes, hoping that further material would turn up for study, but this I have not been able to obtain.

SOME HETEROPTERA FROM VIRGINIA AND NORTH CAROLINA.

BY J. R. DE LA TORRE BUENO AND G. P. ENGELHARDT.

In July and August of this year the junior author made a collecting trip in Virginia and North Carolina, and he took with other things a small number of Heteroptera, among them some of great interest.

In general, the little collection is striking on account of the number of characteristically Southern forms in it. These number 14, out of a total of 39 species taken. The majority, as may be seen, is made up of species familiar to us in this region.

Pentatomidae.

Mormidea lugens Fab.

Virginia Beach, Va., July 20, two specimens; Linville Falls, N. C., Aug. 15, one specimen. This is common everywhere.

Solubea pugnax Fab.

Wilkesboro, N. C., Aug. 9, one specimen; Virginia Beach, Va., July 20, one specimen. Fairly common in meadows and open woods.

A species sometimes found about New York. Previously recorded from North Carolina, but seemingly not from Virginia.

Euschistus ictericus Linn.

Elizabeth City, North Carolina, July 24. A specimen with very prominent pronotal angles. This is presumably a Northern form, but has already been recorded from North Carolina. A number were observed along the swampy margin of a bayou running through a cypress swamp, where they were resting on the leaves of water-lilies and other plants, some mating.

April, 1910

E. servus Say.

Dismal Swamp, Va., July 22, one specimen. Of interest mainly on account of the locality. Taken sweeping along the canal.

E. servus Say? var.?

Virginia Beach, Va., July 20, one specimen.

E. fissilis Uhl.

Wilkesboro, N. C., Aug. 9, one specimen. Apparently not heretofore recorded from North Carolina. Taken in pastures by sweeping.

Thyanta custator Fab.

Three specimens, one each from Blowing R., N. C., Aug. 13; Smith's Island, Aug. 3, and Wilmington, Aug. 1. This is widely distributed throughout the United States.

Murgantia histrionica Hahn.

Virginia Beach, Va., July 20, one specimen. A purely Southern bug, although at times it has been noted in New Jersey under exceptional conditions. This, the only specimen taken, was swept near the seashore.

Nezara hilaris Say.

Dismal Swamp, Va., July 22, one specimen. This is larger than the usual run in this locality. This was found dead in a spider-web.

Dendrocoris fruticicola Bergr.

Wilmington, N. C., Aug. 1, two specimens. Not previously recorded from the State. Beaten from young oaks.

Banasa Packardii Stal.

Smith's Island, N. C., Aug. 3. A long series. This species was described from North Carolina, and has been recorded from Florida, Georgia and New Jersey, the last possibly erroneously. It is presumably a somewhat rare and local form.

This species was observed only on Smith's Island and only on one cedar tree. Close inspection showed this tree to be literally covered, the insects clinging to the twigs and small branches, many in copulation. In spite of the great numbers, they were rather inconspicuous, their colour and markings, especially those of the abdomen, bearing a striking resemblance to the small cedar twigs. On the slightest disturbance they dropped, taking to wing, however, before reaching the ground. A small vial, holding about 50 specimens, was filled from a single twig. A vigorous kick at the trunk dislodged so many as to obscure the air, but after a

short flight all returned and alighted again. As no injury whatsoever could be detected to the tree, which was a splendid specimen, and in the absence of other insects, which might have been the attraction, the visitation evidently was not due to feeding, but more probably a gregarious habit while mating. This conclusion was strengthened by further observations, including the examination of many cedars, as well as other trees, which failed to reveal the presence of the bug elsewhere on the Island.

Orsilochus guttatus.

Wilmington, N. C., Aug. 1, one specimen. This appears to be the first record for the State, and seems to be the most Northern habitat for the species. It is known from Georgia and Florida. Beaten from scrub-oak.

Coreidæ.

Chariesterus antennator Fabr.

Virginia Beach, Va., July 20, one specimen. Under bark.

Corynocoris typhæus Fab.

Virginia Beach, Va., July 20, one specimen; Wilmington, N. C., Aug. 1, one specimen. Swept in a meadow.

Corynocoris distinctus Dallas.

Wilmington, N. C., Aug. 20, one specimen. Both the above apparently are new records. Swept along border of moist meadow.

Acanthocerus galeator Fab.

Roanoke Id., N. C., July 25, one specimen. Under bark of pine.

Leptoglossus phyllopus Linn.

Dismal Swamp, Va., July 22, one specimen. Common on rank vegetation and generally distributed through coastal regions.

Alydus eurinus Say.

Dismal Swamp, July 22, two specimens; Linville Falls, N. C., Aug. 15, one specimen. Taken sweeping and under stones.

A. pilosulus H. S.

Virginia Beach, Va., July 20. Beating.

A. quinquespinosus Say.

Linville Falls, N. C., Aug. 15. Beating.

Lygæidæ.

Cnemodus movortius, Say.

Wilmington, N. C., Aug. 20, two specimens. Sweeping.

Eremocoris ferus? Say.

Roanoke Id., N. C., July 22, a doubtful specimen. Sweeping.

Phlegyas abbreviatus Uhl.

Virginia Beach, Va., July 20, one long-winged example. Sweeping.

Melanocoryphus bicrucis Say.

Wilkesboro, N. C., Aug. 9, two specimens; Linville Falls, N. C., Aug. 15, three specimens. Common in meadows and pasture lands.

Lygæus lineola Dallas.

Dismal Swamp, Va., July 22, one specimen. Sweeping.

*Aradidæ.**Neuroctenus elongatus* Osb.

Wilmington, N. C., Aug. 1. Described by Osborn from Ohio, and recorded by Heidemann from North Carolina and Pennsylvania. Under bark of pine.

*Gerridæ.**Gerris marginatus* Say.

Montezuma, N. C., Aug. 6, four specimens. Very common, as usual.

*Reduviidæ.**Sinea diadema* Fab.

Virginia Beach, Va., July 20, one specimen. Sweeping.

Arilus cristatus Linn.

Smith's Id., N. C., Aug. 3, and Wilmington, Aug. 1.

Zelus bilobus Say.

Wilmington, N. C., Aug. 1, three specimens; Smith's Id., N. C., Aug. 3, one specimen.

Z. cervicalis Stal.

Virginia Beach, Va., July 20, one specimen; Roanoke Id., N. C., July 25, one specimen; Wilmington, N. C., Aug. 1, one specimen. This and the preceding are distinctly Southern.

Z. luridus Stal.

Roanoke Id., N. C., July 25, one specimen. This is common all through the Atlantic States. These three species common in moist situations.

Hygromystes n. sp.

Roanoke Id., Aug. 1, two specimens. Swept from sedges back of beach.

Melanolestes picipes H. S.

Dismal Swamp, Va., July 20, one specimen.

M. abdominalis H. S.

Wilmington, N. C., Aug. 1, one specimen. Very common under stones and logs.

Conorhinus sanguisugus Lec.

Virginia Beach, Va., July 20; Smith's Id., N. C., Aug. 3. This is the "Big Bedbug," a common Southern Reduviid, who at times performs functions similar to his humbler and more malodorous domesticated namesake. Taken under bark or logs.

*Phymatidæ.**Phymata erosa* Linn.

Virginia Beach, Va., July 20, one specimen; Roanoke Id., N. C., July 25, one specimen; Wilmington, N. C., Aug. 1, two specimens. Very common.

*Gelastocoridæ.**Gelastocoris* n. sp.

Roanoke Id., N. C., July 25, two specimens of an undescribed form. Taken near beach.

*Corixidæ.**Corixa* sp.

Dismal Swamp, Va., July 22, four specimens of a small form. Attracted to light.

*Notonectidæ.**Notonecta undulata* Say.

Johnston City, N. C., Aug. 17.

BOOK NOTICE.

EXPERIMENTS ON THE GENERATION OF INSECTS: by Francis Redi, of Arezzo. Translated from the Italian edition of 1688 by Mab Bigelow. Open Court Publishing Co., Chicago.

The average entomologist of to-day is apt, perhaps, to give little thought to the work of the pioneers of biological science in pre-Linnæan times, partly no doubt because the records of such work are not easily accessible to many. Such a book as this excellent English translation of Redi's famous work is therefore to be welcomed by all who would be acquainted with the work and character of the great Italian naturalist.

In the time of Redi belief in the origin of insects and most of the lower animals by spontaneous generation was almost universal, but he proved by a series of experiments recorded here that flies, bees and other insects are hatched as larvæ from fertilized eggs, and that the larvæ develop into the mature insects. After discussing the beliefs of the ancient Greek philosophers and others whose authority held weight in his time, Redi describes a number of experiments, by which he demonstrates that the maggots which appear in decaying meat change into pupæ ("eggs"), and that from these pupæ flies emerge. He also discovered the hatching of maggots from true eggs, and determined that these eggs were deposited by flies. The proof that the maggots and flies were not generated from the meat, but always from eggs deposited by flies of the same kind, was furnished by the discovery that meat placed in closed vessels or underground did not become wormy. By using the flesh of many kinds of animals in his experiments, he also showed that the species of flies obtained were independent of the kind of meat in which they were bred. Cheese-flies and fruit-flies were also proved to develop from larvæ hatched from eggs.

The habits and life-histories of many other animals are discussed, and the absurdity of the current beliefs concerning their origin exposed. The widespread beliefs in the origin of bees from the decayed flesh of bulls, wasps and hornets from horses, scorpions from the dead bodies of their own kind, spiders from flying seeds, and filth, etc., are all shown to be myths and old wives' tales.

Special attention is given to the consideration of gall insects and parasites of various kinds. Unfortunately, although Redi attempted to disprove the generation of these forms from the tissues of their hosts, his investigations were not complete enough to demonstrate his idea, and only led him back to his former trust in the teachings of Aristotle.

The translation is written in a clear, simple style, and includes in the introduction a short life of Redi and a bibliography. The illustrations, most of which represent various species of Mallophaga and parasitic Hemiptera, are reproductions of those in the Italian edition, and exhibit a considerable degree of accuracy.

One error may be noticed here. The insect called by Redi "Cavallucci" is not a Mantis but a Phasmid, probably *Bacillus Rossii* Fab. This is evident from the illustrations.



FIG. 1.—HABITAT OF CHRYSOPHANUS DORCASI KIRBY AT WAUCEDAH, MICH.



FIGS. 2 AND 3.—HABITAT OF *CHRYSOPHANUS EPIXANTHE*
BD. & LEC. AT TOMAHAWK LAKE, MICH.

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CHRY SOPHANUS DORCAS KIRBY, AND RELATED SPECIES IN THE UPPER PENINSULA OF MICHIGAN.

BY WILLIAM W. NEWCOMB, M.D., DETROIT, MICH.

The principal object of this paper is to present some observations upon three species of *Chrysophanus*, *dorcas*, *epixanthe* and *heloïdes*, which were found in Dickinson County during the summer of 1909, while the author was collecting insects for the Michigan Geological and Natural History Survey. Through the courtesy of Dr. Alexander G. Ruthven, Chief Field Naturalist of the Survey, I am enabled to give these notes in advance of the full report.

Up to the time these observations were made, I could obtain no authentic records of any of these butterflies from Michigan, except of *dorcas* from the Lower Peninsula. But on this expedition definite data were secured of the occurrence of all three in Dickinson County, in the Upper Peninsula. From the time of arrival of the party in the field diligent search was made for both *dorcas* and *epixanthe* and their food-plants, as it was particularly desired to add to the knowledge of the distribution of these species in Michigan.

The food-plant of *dorcas*, the shrubby cinquefoil (*Dasiphora fruticosa*), which I discovered in the summer of 1908, while making investigations upon this insect in the southern part of the State, was not found by us in Dickinson County until the second of August. On this date a member of the party brought in a spray of the plant from Waucedah, a small town some sixteen miles south of Brown Lake. On the fourth of August I was able to visit the locality, and found, just east of the railroad station at Waucedah, many acres of the shrubby cinquefoil (locally called "nine-bark"), (pl. IV, fig. 1). It was very thrifty, the bushes being fine large ones, and few having the dwarfed appearance of those often seen in Oakland County, in the southern part of the State. In fact, in spots it fairly crowded out all other vegetation. Notwithstanding the late date, the imagoes of *dorcas* were abundant; some of the males were worn and some in good shape, while all of the females observed, with one exception,

were in fine condition. No pairs in copulation were seen, and no eggs were found upon examination of a large bunch of the cinquefoil. The bright condition of the butterflies, absence of eggs, etc., indicated one of two things—either *dorcas* appears much later in the northern part of the State than in the southern, or the season of 1909 was unusually late. The latter was undoubtedly the case, for the species was taken in good condition in both sexes in Oakland County the same summer on July 25th, a date at least two, perhaps three, weeks later. Further observations, however, are needed on the exact time of appearance in a normal year, since the past two summers (1908 and 1909) in which this species has been studied, have been unusually backward in Southern Michigan. While the difference in latitude might account for a slight difference in the dates of appearance, it should be noted that the conditions which the bogs present to the butterflies, at least in the vegetation and low temperature, are probably little different north or south in the State, for the bogs in Southern Michigan preserve their boreal character, although set in more southern surroundings.

Until we found them at Waucedah, our search for the *fruticosa* and *dorcas* had been confined to the country about Brown Lake, practically entirely away from the inroads of civilization. Apparently very favourable localities existed for the plant about the margins of the bogs and lakes in that region, but it could not be found. I mention this, as it would seem that *Dasiphora fruticosa* and its tenant *dorcas* can enter such regions only after the latter have been altered by man, or that considerable open areas (natural or artificial) about the borders of bogs, etc., are necessary for the successful establishment of this shrub.

I was able to make only one other short trip to the Waucedah habitat on the ninth of August. The condition of the females, still bright and fresh and more numerous than five days before, two pairs in copulation and only slight evidence of oviposition (only two eggs having been found on a large lot of *fruticosa*), emphasized the late flight of the species.

Sixty females were collected, and I find that the most noticeable difference between this series of females and those taken in Southern Michigan lies in the predominant amount of yellow in the northern ones (form *florus*). There is not a specimen in the lot that does not show an indication of yellow, while in about one-fourth of them it is conspicuous in a nearly complete band adjacent to the outer side of the transverse row of black spots. In the others there are various gradations in the amount of yellow down to an almost entire absence of that colour. This is in

contrast to the conditions in Southern Michigan, where the form of the female without any yellow is the usual one, the intergrades with varying amounts of yellow coming next and those with the nearly complete band occurring comparatively rarely. The bright effect in those specimens of *florus* with the yellow predominating is heightened by an extension of the line of orange crescents from anal angle along the outer border; three, and sometimes four, well-marked crescents in such cases may be counted. In typical *dorcas* from Southern Michigan these crescents are practically obliterated, and in *florus* reduced to one or two, rarely three.

A form of the female which had not previously been met with was found in the Waucedah habitat. There were seven examples collected, two of which are particularly noteworthy. In these, the ground colour is of a uniformly lighter shade of brown than in the ordinary form, the entire surface of both wings is more or less stippled with a darker brown, the black dots are less conspicuous because of the stippling, the orange crescent at the anal angle is nearly obsolete, and the yellow on the fore wings is merely indicated. The other five present these differences less prominently and grade into the normal form, but four of them exhibit more or less of the yellow of *florus*. None of the males show any noteworthy variations, but I might add that I have one male from Oakland County in which there is a slight stippling in the darker, outer portion of the hind wings.

The distribution of *epixanthe* in Michigan is virtually unknown, except as it may be partially inferred from the presence of cranberry bogs, in the vicinity of which it occurs. Personally, I believe it will be found at many points in the State, both north and south. A number of years ago this species was reported from Grand Rapids,* but evidently in error for *dorcas*. It has also been stated as occurring on Isle Royale, but this again appears to be a doubtful record. The late Dr. Fletcher, quoted in the 1909 Isle Royale Report, says of *epixanthe*:†

"This is the only species I have some doubts about. There is no doubt that some of the records of *epixanthe* should be of the rare and little-understood species *dorcas*, which occurs in the Lake Superior region and into Manitoba. It is easily distinguished from *epixanthe* by its slightly larger size and the brilliant orange wash on the under surface. *Epixanthe*

*Robt. H. Wolcott: Butterflies of Grand Rapids, Mich., CAN. ENT., Vol. XXV, p. 103.

†An Ecological Survey of Isle Royale, Lake Superior, Chas. C. Adams, 1909. Published as part of the Report of the Board of Geological Survey of Michigan for 1908, p. 274.

I have only actually taken myself in Ontario. *Dorcas* I have from Nepigon on Lake Superior, the Bruce Peninsula and from Manitoba, west of that the form, for it is hardly a variety, *florus*, which is really only a dimorphic form of *heloïdes*, occurs, and has, I think, sometimes been recorded as *epixanthe*. The reference of *florus* to *dorcas* instead of *heloïdes* as a variety, which was done by Dr. Dyar, has, in my opinion, no reason in it at all."

This is a mistake. *Florus* does not belong to *heloïdes*; it is simply a form of *dorcas*, and occurs only in the female sex. Why Dr. Fletcher should have been in doubt as to the identification of *epixanthe* is not clear, unless he failed to see all the specimens, for four were reported as captured, and it would seem as though some one of them would have been recognizable.

Epixanthe was located in Dickinson County in at least two places, and possibly in a third. It was first found at Tomahawk Lake (Pl. V, figs. 2 and 3), a small lake of about ten acres extent, just west of Brown Lake. Surrounding the lake was a typical black spruce and tamarack bog, from which the higher vegetation was largely removed by the fierce forest fires of the preceding season, which had left only a few trees and a margin of unburnt vegetation a few feet to forty or fifty feet wide at the water's edge. Within this area grew a variety of bog plants and a goodly amount of cranberry.

Epixanthe was first detected in this bog on July 9th. It was in its prime from about the 11th to the 17th, on each of which dates and on the 15th a fair number were observed flying. Males were always more numerous than females, in the proportion of four or five to one. The last seen at Tomahawk Lake were on the 30th, when three or four worn males and one female were observed. On August 18th a belated female was met with near Tamarack Lake, about two miles south of Brown Lake. A brief search resulted in the finding of some cranberry nearby. The third instance in which the species was probably detected was on July 24th, when a small butterfly, which I took to be *epixanthe*, was flushed out, but not captured, in a cedar tamarack swamp not far from Brown Lake; cranberry was also growing there.

The butterflies of *epixanthe* were very uniform, and differed from specimens from other localities only in a slight difference in the colour of the under surface. This was a purer, chalky-white, especially on the hind wings, than in specimens from Ottawa, Canada, and Lakewood, New Jersey, examples from the last named place being decidedly yellowish.

Helloides, as was to be expected, was found at several points, although nowhere commonly, the greatest number seen on any one day being six or seven at Foster City. It was also observed at Norway, Waucedah, Brown Lake, Tomahawk Lake, Jackson Lake, etc. There were two generations, the first one being met with during the latter part of June and the first part of July, the second one in fresh specimens on August 9th and 14th. Michigan is the most eastern State in which the species has yet been found, although Dickinson County is in about the same longitude (87° – 88° west) as Lake County, in the north-western part of Indiana, where *helloides* is also known. This is a western butterfly, and its occurrence in the Upper Peninsula is an addition to the western element in the fauna of that region.

Two other species of the genus, *hypophleas* and *thoe*, were also met with in the County, but not at any time in numbers.

WISCONSIN BEES—NEW AND LITTLE-KNOWN SPECIES.

BY S. GRÄNICHER, PUBLIC MUSEUM, MILWAUKEE.

(Continued from page 104.)

Anthidium, Fabr.

Anthidium (*Protanthidium*) *Chippewaense*, n. sp.

♂.—Length about 15 mm. Black, with bright yellow markings. Body closely punctured all over, especially so on head and thorax, clothed with fulvous pubescence on vertex, mesonotum and pleuræ, and whitish pubescence on face and thorax underneath. Scutellum slightly bilobed. Clypeus and sides of face whitish-yellow. Apical margin of clypeus with a row of five small black teeth. Mandibles whitish-yellow with black tips. A yellow line behind the eye above, and markings of the same colour on the following parts of the body: A line on posterior margin of tubercle, a spot at base and two spots near the apex (one in each corner) of each tibia on its outer surface; outer surfaces of all the metatarsi; dorsal bands on abdominal segments 1 to 6, interrupted on 1. These bands border on the narrow depressed black apical margins of the segments. They are very narrow in the middle of segments 1 to 4, broaden out laterally, and show a distinct emargination anteriorly on each side of band 1 to 4. On segment 5 the band is broad, on 6 still broader, taking up the greater part of the segment, deeply emarginated anteriorly in the middle. Dorsum of segment 7 entirely black, truncate at apex, with rounded corners, a median carina, and ending in a median distinct tooth.

♀.—Somewhat smaller than the male, but of the same general appearance. Clypeus and sides of face of the same bright yellow colour as the markings of other parts of the body. Face-marks narrowing above, and extending up along the anterior orbits to a greater distance than in the male. Mandibles entirely black. A line behind the eye above, a spot on each side of the thorax just above the anterior half of the tegulæ, and two spots on the scutellum yellow. Scutellum not bilobed. Tibiæ with a yellow spot on the outer surface near the base. Inner surfaces of metatarsi with fulvous pubescence. Yellow continuous bands on abdominal segments 1 to 5, not reaching the sides of the segments, narrow in the middle, broadened laterally, slightly emarginate on the outer borders of bands 3 to 5. Band on segment 1 interrupted in one of the specimens. Ventral scopa light fulvous.

Types: August 3, 1909, Indian village at the juncture of the Lower Tamarack and St. Croix Rivers, Pine Co., Minnesota. On the flowers of *Rudbeckia laciniata*. (Nos. 31757 and 31758.)

Paratypes: Three ♀'s taken between July 28 and August 2 on the Wisconsin side of the St. Croix River, near the mouth of the Yellow River in Burnett Co. These specimens were collected from the flowers of *Rudbeckia hirta*. This species is very similar to *Protanthidium Cockerelli* Titus, occurring in Colorado.

Halictus Latr.

Halictus Vierecki Crawford.

H. Vierecki Crawford, Ent. News, XV, 79, ♀.

♂.—Length about 4 mm. Head and mesonotum dull metallic-green, pleuræ of the same brassy colour as head and thorax in the female. Abdomen more reddish than in the female, with blackish clouds, especially on the last four segments. Pubescence whitish throughout, notably on the face (golden-yellow in the female). Antennæ long and slender, scape and first joint of flagellum dark brown, the remaining joints testaceous on their lower surfaces, brown above. Legs darker than in the female.

One ♂ (No. 29435), mouth of Yellow River, Burnett Co., Wis., taken between July 28 and 31, 1909, on the flowers of *Ceanothus Americanus*. Nineteen ♀'s were obtained in the same locality during the same period, as also at Randall, Burnett Co., Wis., from Aug. 5 to 7, 1909, from the flowers of *Ceanothus Americanus* and *Solidago graminifolia*. They were collected by the Milw. Publ. Mus. coll. exped., and are all in the collection of the Museum.

This species, which was described from female specimens found in New Jersey and the District of Columbia, has a wide range of distribution. It is not uncommon in north-western Wisconsin at the points mentioned, and a few years ago I received, through the kindness of Mr. Hartmann, of Austin, Tex., four female specimens from that locality.

Sphécodes Latr.

Sphécodes Davisii Rob.

S. Davisii Robertson, Trans. St. Louis Ac. Sc., VII, 319, ♂.

♂.—Nine specimens from 7 to 10 mm. in length. In some of these the black on the basal portion of the first abdominal segment takes up nearly the entire segment, leaving only a narrow apical strip of red. Second segment entirely red, third either entirely red or with a black apical margin.

♀.—Head dull, closely punctured. A prominent median ridge from the front ocellus down to the base of the antennæ. Mandible with a very distinct tooth. Antennæ rather short and thickened towards the tip, black, with a slight trace of reddish underneath. Mesonotum dull, strongly and closely punctured, on the disk, however, as also on the scutellum, where the punctures are farther apart, the surface is somewhat shining. A distinct rim bordering the semicircular enclosure of the metathorax. Enclosure, truncation and sides of the metathorax all coarsely sculptured. Wings not as clear as in the male, and nervures darker. Abdomen red, sometimes with a blackish hue around the tip. First segment shining and impunctate. Remaining segments finely and closely punctured, except on the depressed apical borders of segments 2 to 4. Length, 8 to 10 mm.

Fourteen ♀ specimens from Milwaukee, Racine and Washington Cos. in Wisconsin, and one ♀ from Ludington, Mason Co., Michigan.

In size, sculpture and opaque appearance of head and thorax the female of this species, which is a *Sphécodes sens. strict.*, as defined by Robertson, resembles two other species of the Milwaukee region, viz.: *S. (Proteraner) ranunculi* Rob., and *S. (Drepanium) falcifer* Patton.

Andrena Fabr.

Andrena Peckhami Ckll.

A. Peckhami Cockerell, Ann. and Mag. Nat. Hist., 7, IX, 105, ♀.

♀.—The type is about 8½ mm. long, but the length may reach 10 mm.

♂.—Length, 7–8 mm. Head very large, clothed with long white hairs. Face broad, shining, anterior border of clypeus slightly emarginate. Mandibles long and curved, dentate, rufous at apex. Antennæ black,

joint 3 about equal to 4 + 5. Cheeks broad and subquadrate, shining, slightly convex, with an upturned rim along the hind margin, and a rounded lower angle situated below the middle of the eye. Thorax shining, covered with long and soft white pubescence, intermixed with short and black pubescence on the mesonotum. Abdomen shining, with distinct apical bands of white hair on segments 2 to 4, widely interrupted on 2.

Eleven ♂ specimens from Milwaukee, the type locality. Besides, I have taken both sexes at Cedar Lake, Washington Co., Wis., and at various points along the St. Croix River in north-western Wisconsin, from the Nemakagon River in Burnett Co., on down to Farmington Township in Polk Co. (Milw. Publ. Mus. coll. expd.)

As Prof. Cockerell has remarked (loc. cit., p. 105), this species is very close to *A. parnassie* Ckll., but the latter makes its appearance later, around the last week in August, and visits exclusively the flowers of *Parnassia caroliniana*. *A. Peckhami*, on the other hand, flies from the second week in July on to near the middle of August, and visits especially the flowers of the Compositæ. In the type specimens, as stated by Prof. Cockerell, the first recurrent nervure joins the second submarginal cell at its middle in *parnassie*, and considerably beyond the middle in *Peckhami*, but a series of specimens shows these characters as being variable, and therefore not reliable in separating the two. The presence of distinct abdominal hair-bands in the male of *Peckhami* distinguishes it from the male of *parnassie*, and the two differ besides in the shape of the cheeks, which are subquadrate in *Peckhami*, subtriangular, with a distinct angle above the middle of the eye in *parnassie*.

Andrena clypeonitens Ckll.

A. clypeonitens Cockerell, CAN. ENT., XXXIV, 47, ♀.

♂.—Length about 9 mm. Black, with ochreous pubescence as in the female; head, abdomen and legs shining, thorax dull. Antennæ black, joint 3 slightly longer than 5, the latter equalling 4. Mandibles long and curved, black, notched near the apex. Cheeks broad, shining, subtriangular, with a reflexed hind margin and a distinct angle slightly above the middle of the eye. Legs black, posterior tarsi somewhat ferruginous. Abdomen with bands of short ochreous hair on the posterior margins of segments 2 to 4 in one of the specimens (No. 31727, Milwaukee, August 18, 1908); in the second (No. 29014, Nemakagon River, Burnett Co., Wis., July 25, 1909), these bands are not developed. Both males in the collection of the Milw. Publ. Museum.

This bee has been found also at Cedar Lake, Washington Co., Wis.

NOTES ON A FEW *SCOLYTIDÆ*.

BY J. M. SWAINE, MACDONALD COLLEGE, QUEBEC.

The three American species of *Xyleborus*, *pyri* Zimm., *tachygraphus* Zimm., and *obesus* Lec., form a well-defined group among the described American species of the genus. They are distinguished by the short, stout form, and by the peculiar minute and humpbacked males. These species have been separated as the genus *Anisandrus* F., and by others as the subgenus *Anisandrus*. In view of intermediate forms the separation of these species as a distinct genus would hardly seem warranted. The genus *Xyleborus*, as at present constituted, however, contains about 240 species, and subgenera would be convenient. I consider the forms named above, together with the species described in this paper, as belonging to the subgenus *Anisandrus*. Dr. LeConte has described the antennal funicle of these species as "4-jointed." This is certainly an error. The funicle is distinctly 5-segmented, with the first segment large and subglobular. In N. Y. State Museum Bulletin, 134, plate 13, fig. 42, the description should read: "Part of antennal funicle and antennal club."

Pyri Zimm., has long been considered a synonym of the European form, *dispar* Fabr. From a careful comparison of American and European specimens I feel satisfied that all belong to one species, but I find in my specimens slight but constant differences. In the American specimens the minute reticulations of the chitin are so developed that the body is quite opaque, but little shining; in the European specimens these reticulations are less developed, and the body is decidedly shining. The American males have the first three interspaces of the elytral disk rough, with transverse ridges; the European males have these interspaces nearly smooth. From my specimens it would appear that *pyri* Zimm., is a variety of *dispar* Fabr. If these differences are found to be constant, they have perhaps been developed since fruit trees were first brought to America.

Of the other two described American species, *tachygraphus* appears to be quite distinct. The original description of Zimmerman is here quoted:

"*X. tachygraphus* Zimm.—Long, $1\frac{1}{2}$ lin.; brown; antennæ and feet ferruginous-yellow; prothorax not longer than wide, roughly tuberculate, more coarsely in front than behind, thinly pubescent; elytra short cylindrical, behind obtusely rounded, punctate-striate, the intervals also punctured, with fine rows of hairs, and behind also with small elevated

teeth. North Carolina. (This species is also found in Pennsylvania.—Lec.)"

The females are readily distinguished from those of the allied species by the granulations of the caudal half of the pronotum and the teeth of the declivital interspaces. The pronotum appears almost square from above, and the entire disk is rough; with large flattened spines in front, reduced to small flattened granules behind. The elytra are $1\frac{1}{2}$ times as long as the pronotum; sides straight to beyond the bend of the declivity; sutural striae more strongly impressed, particularly on the declivity; second and third interspaces wider on the declivity and each bearing three or four acute denticles, those of the second larger; the outer interspaces each with a few acute granules. I have not seen males of this species.

I have never seen a specimen which I could reconcile with Dr. LeConte's description of *obesus*, quoted below. Apparently it has the general characters of *dispar*, about the same length, 3 mm., but a much stouter form and more widely-spaced elytral punctures. It cannot be the form here described as *serratus*—the teeth of the declivital ridge in *serratus* (♀) are very distinct. It may be a large variety of the form here described as *minor*; that can only be determined by an examination of the type. It cannot, of course, be the male of *dispar*, for the length given for *obesus* is entirely too great.

Original description of *X. obesus* Lec. (LeConte, Trans. Am. Ent. Soc., 1868, page 159): "*X. obesus*.—Short and stout, cylindrical, blackish-brown, thinly clothed with long, soft, erect pale hairs, antennae reddish-brown; head convex, coarsely but not densely punctured; prothorax rather broader than long, strongly roughened with subacute tubercles in front, nearly smooth behind; elytra with rows of large punctures, not very closely set, intervals flat, marked with small distant punctures, from which proceed the long hairs; tip obliquely declivous, not tuberculate, but with the striae somewhat impressed, and the side and tip acutely margined, as in the two preceding species. Long, 3 mm.

Virginia, Massachusetts and Canada. Differs from the two preceding by its much stouter form and by the absence of the small acute tubercles of the declivous tip of the elytra."

Xyleborus serratus, n. sp.—Female: Length, $3\frac{1}{4}$ – $3\frac{1}{2}$ mm.; width, $1\frac{1}{3}$ – $1\frac{1}{2}$ mm. Black, and sparsely clothed with long, slender grayish hairs, which are shorter on the disk of the pronotum. It is closely allied to *dispar* (♀), but differs in the following characters: It is larger and

stouter; the front is more shining, with the epistomal carina often more strongly developed. The disk of the pronotum is more shining behind. The elytra bear regular rows of punctures, which are smaller than those of *dispar*, and not so closely placed. In *serratus* the diameter of the punctures is almost always distinctly less than the distance between the punctures in the rows. (In *dispar* the diameter of the punctures is usually equal to or greater than the distance between the punctures in the rows; this is more noticeable near the suture.) These punctures bear very minute hairs. The interspaces bear in front minute punctures, which are replaced behind by small granules. From these punctures and granules arise the long hairs with which the elytra are clothed. The seventh interspace is raised behind into an acute, serrate ridge, which forms the ventral margin of the declivity on the sides. This ridge bears three or four acute, curved, separated spines and several smaller acute granules. This ridge is present also in *dispar*, but is not so strongly raised, not so acute, and though usually slightly crenulate, and sometimes with one or two minute granules, is never at all serrate. In *serratus* the fifth abdominal sternite has the punctures of the median area much smaller and sparser than those on the sides, and the anterior margin of the fourth sternite is usually nearly smooth. In *dispar* the abdominal sternites are usually equally punctured. In *serratus* the anterior tibiae are wider than in *dispar*, and with the teeth longer and more closely placed. Aside from these differences, the sculpture of *serratus* (♀) agrees closely with that of *dispar*.

Male: Length, $1\frac{2}{3}$ – $1\frac{3}{4}$ mm. Front moderately convex, sometimes with a slight median impression, shining, with punctures sparse and small across median area, but close on epistomal margin; hairs long and slender, with dense fringe of shorter yellow hairs along epistomal margin. The pronotum is rather sparsely clothed with long slender hairs. The outline from above is subcircular, very slightly narrowed in front and broadly rounded in front and behind. The cephalic asperations are very minute. The caudal half is finely punctured, with a smooth median space of variable extent. The elytra are sparsely hairy, with long hairs from the interspaces, and with rows of widely-separated punctures (much as in the ♀) bearing short hairs; interspaces with small punctures, and minute granules behind. The interspaces are not much roughened. The ridge of the seventh interspace on the declivity is, as in the allied males, not much developed, with a few small granules, but no teeth. The tibiae are more slender than in the female and with fewer teeth. The venter is sparsely and coarsely punctured. In *Betula lutea*, diseased trees, Ste. Anne de Bellevue, Que.; St. Hilaire, Que.

There is a smaller form belonging to this subgenus which may be *obesus* Lec., but which is constantly much smaller than the length, 3 mm., given by Dr. LeConte. Among many specimens of this smaller form collected in Quebec and New York State I find no considerable variation in size, $2\frac{1}{4}$ – $2\frac{1}{2}$ mm. long. I present here a description of these small specimens as *X. obesus*, variety *minor*.

Xyleborus obesus, variety *minor*.—Female: Length, $2\frac{1}{4}$ – $2\frac{1}{2}$ mm.; width : length :: 60 : 137 (average of pinned specimens.) Front convex, punctured and sparsely hairy, with epistomal fringe, median carina very faint. Pronotum, outlined from above, slightly wider than long (60:50–55), truncate behind, very slightly rounded on the sides and very broadly rounded in front; asperate in front and sparsely punctured behind, with the faintest trace of a median carina; sparsely hairy. Elytra: width : length :: 60 : 80 (average); hairy, slender hairs from the interspaces; rows of punctures very slightly impressed, noticeably so on the declivity; punctures of the rows more widely spaced than in *dispar*, the distance between the punctures in the rows usually greater than the diameter of the punctures; the interspaces wide, with irregular, very fine punctures replaced by minute granules behind; the seventh interspace ridged behind and forming the ventral margin of the declivity, as in *dispar*, but with a few acute granules.

Male: The front is sparsely punctured and with long hairs. The carina is slightly developed. The epistomal fringe is longer and thinner than in *serratus* (♂). The asperations of the pronotum are sparse but well developed; the caudal half is punctured as usual, but the smooth median space is absent in my specimens; the outline from above is broadly rounded in front and behind, more strongly narrowed in front than in *serratus* (♂), but not so strongly as in *dispar* (♂); sparsely hairy, as in *serratus*. Elytra much as in *serratus* (♂), hairy, and with rows of widely-spaced punctures. In *Betula lutea*, *B. populifolia*, *Acer*, diseased trees. Montreal Island, St. Hilaire, Que.; Ithaca, N. Y.

Xyleborus dispar F.—Male: Length, 2 mm. Front nearly opaque, punctured and hairy, much as in *serratus* (♂), but with the median carina of the ♀ distinct. The pronotum is coarsely asperate in front, but slightly less so than in the ♀, punctured behind, and with a distinct smooth median space. The long hairs are developed only on the sides, the hairs of the disk being very short. The outline of the pronotum from above is strongly narrowed in front and narrowly rounded. The elytra also have the disk nearly naked, the long hairs forming a fringe around

the sides and behind. The rows of punctures are slightly impressed, so that the elytra is faintly striate. The punctures are large, deeply impressed, and as closely placed as in the female. The interstitial punctures and granules are much as in the female.

KEY TO THE AMERICAN SPECIES OF THE SUBGENUS ANISANDRUS FERR.

- A. Body stout, cylindric; hind wings well developed.....Females.
 - B. Pronotum rough throughout, asperations in front, granules behind; elytral declivity with teeth on 2nd and 3rd interspaces.....*tachygraphus* Zimm.
 - BB. Pronotum nearly smooth behind, 2nd and 3rd interspaces of the elytra without teeth.
 - C. The ridge formed on the declivity by 7th interspace strongly and sparsely toothed.....*serratus*, n. sp.
 - CC. The above ridge not toothed.
 - D. Length, 3 mm. to $3\frac{1}{4}$ mm.; pronotum as long as wide; punctures of elytral striæ closely placed; the distance between the punctures equal to or less than the diameter of the punctures*dispar* F.
 - DD. Length, $2\frac{1}{4}$ - $2\frac{1}{2}$ mm.; pronotum wider than long, width: length :: 6:5; outline of pronotum from above very broadly rounded in front and truncate behind; punctures of elytral striæ more closely placed, distance between punctures usually greater than diameter of punctures.....*minor*.*
- AA. Body much smaller, *flattened*, hump-backed and oval in outline from above; wings very small, functionless.....Males.
 - B. Pronotum and elytra with central portion with only very short hairs, elytra striate, punctures closely placed, regular, interspaces with large granules behind.....*dispar* F.
 - BB. Body entirely clothed with long hairs above; elytra with rows of punctures, punctures more widely spaced, variably irregular behind, interspaces with the granules very small.
 - C. Pronotum with very minute asperations; larger, $1\frac{2}{3}$ - $1\frac{3}{4}$ mm.....*serratus*, n. sp.
 - CC. Pronotum with sparse, well-developed asperations in front; smaller, 1 - $1\frac{1}{4}$ mm.....*minor*.*

*A variety of *obesus* Lec. (?)

TWO NEW SPECIES OF PENTATOMIDÆ FROM NEBRASKA.

BY J. T. ZIMMER, UNIVERSITY OF NEBRASKA.

While working over the material contained in the collection of the University of Nebraska, two undescribed species of Pentatomidæ have thus far come to my notice:

Family PENTATOMIDÆ.

Subfamily Cydninæ.

Annectus pallidus, n. sp. (Fig. 10, a, b, c).

General appearance of *A. pusillus* Uhler. Colour flavo-testaceous. Head rounded; tylus very slightly exceeding juga, and with four terminal comb-teeth; juga, each with five comb-teeth; head coarsely punctured. Margins of pronotum convex anteriorly, concave posteriorly, distinctly



FIG. 11.—*Euschistus latimarginatus*, n. sp. (x 2.5).

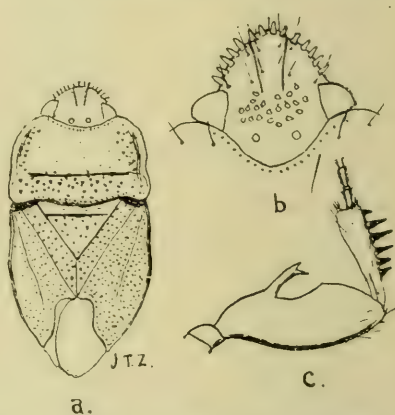


FIG. 10.—*Annectus pallidus*, n. sp.—a, Entire insect (x 16); b, Head (greatly enlarged); c, Anterior leg (greatly enlarged).

impressed, transverse line posteriorly; back of this line and on lateral submargin distinctly, coarsely punctured; punctures on rest of pronotum finer, less distinct, with the exception of a submarginal row of small but distinct punctures on anterior edge, as in *A. subferrugineus* Hope, and another such row along posterior margin. Scutellum with large, distinct punctures; basal impunctate margin separated from punctate portion by distinct, transverse, impressed line. Corium rather heavily punctate, exceeding abdomen in length; posterior margin trisinuate. Abdomen

with prostrate pubescence. Legs flavo-testaceous; tibiae armed with spines, those on anterior tibiae stouter, piceous. Anterior femora (at least in ♀) with large arcuate, bifid teeth as in *A. spinifrons* (Say). Antennae flavo-testaceous; second joint small, third joint longest, fourth and fifth joints equal. Length (♀), 2.75 mm.; humeral breadth (♀), 1.25 mm.

Type, 1 ♀, South-east Nebraska (L. Bruner), in University of Nebraska collection.

This small form is easily recognized by the bifid tooth on the anterior femora, by the size, and by the number of comb-teeth on the juga.

Subfamily Pentatominae.

Euschistus latimarginatus, n. sp. (Fig. 11.)

General appearance of *E. fissilis* Uhler, but form much broader posteriorly. Colour pale yellow, distinctly punctured with fuscous or black, the punctures tending more or less to coalesce and group themselves irregularly, especially along the latero-anterior pronotal submargins, the margins being calloused, impunctate, pale. Juga longer than the tylus, leaving the apex of the head distinctly incised as in *E. fissilis* Uhler. Antennae pale at base, fifth and distal half of fourth joint blackish; second, third, fourth and fifth joints subequal, longer than the first joint; first joint reaching at least as far as distal end of tylus. Latero-anterior margins of pronotum concave; humeral angles prominent, subacute. Tip of scutellum paler, impunctate. Membrane immaculate. Hemelytra much narrower than the abdomen, leaving connexivum exposed. Connexivum broad, calloused, pale, forming a conspicuous lateral margin to abdomen when viewed dorsally. Legs dotted with fuscous. Venter more or less distinctly punctured; punctures on pectus larger and more distinct than those on abdomen. Angles of ventral abdominal segments darker, but without conspicuous black points. Length (♀), 14.5-15 mm.; humeral breadth (♀), 8-9.5 mm.; breadth of abdomen (♀), 8 mm.

Type, 1 ♀, Dewey Lake Township, Cherry Co., Nebraska, June (R. H. Wolcott). Paratypes, two ♀'s, Brady Island, Nebraska, May, 1896 (L. Bruner); 1 ♀, Dismal River, Nebraska, July, 1889 (L. Bruner); 1 ♀, Halsey, Nebraska, June, 190-, (L. Bruner, J. C. Crawford). Type and paratypes in University of Nebraska collection.

This form is very readily recognized by the head with the apex incised, by the broad, pale, exposed connexivum, and by the immaculate membrane. It is a sand-hills form, Dewey Lake Township, Brady Island, Dismal River and Halsey being situated in typical sand-hill country. So far, all specimens taken have been females.

A NEW GELECHIA INQUILINOUS IN CECIDOMYIID GALLS.

BY AUGUST BUSCK, WASHINGTON. D. C.

Gelechia inquilinella, new species.

Labial palpi normal for the genus, with moderate furrowed brush, longest at base, gradually shorter towards the tip of second joint; second joint white, strongly sprinkled with blackish fuscous scales; terminal joint nearly as long as second, blackish fuscous, slightly sprinkled with white. Antennæ slightly serrated, bluish-black, each joint spotted with white on the under side. Face light steel-gray; head darker gray, tipped with black. Thorax blackish fuscous. Fore wings with whitish ground colour, but so heavily overlaid with bluish-black and dark fuscous scales as to appear blackish-fuscous to the naked eye. On the middle of the cell is a small, obscure, ill-defined black spot; on the fold below and at the end of the cell are similar equally obscure black spots, both slightly edged by a few dark ochreous scales. Cilia light gray. Hind wings broader than the fore wings, light shining fuscous; cilia still lighter, with an ochreous tint. Abdomen dark fuscous. Legs blackish fuscous, with the tuft on the posterior tibial light straw-coloured. Venation typical; hind wings with 3 and 4 connate, 6 and 7 short-stalked.

Alar expanse, 14-15 mm.

Habitat: Karner, New York. Issued March 24, 1910.

Type, U. S. Nat. Mus. No. 13119.

"Bred from brassicoides gall of Cecidomyiid on willow" (Felt).

Received from Dr. E. P. Felt, who has asked me to publish this description for his use in connection with his work on *Cecidomyiidae*. The species is an obscure looking, typical *Gelechia*, nearest in coloration and oral parts to *Gelechia pravinominella* Chambers.

OBITUARY.

The Rev. Jeremiah Lott Zabriskie, well known for his work in Entomology and Microscopy, died at his home in Brooklyn, N. Y., on April 2, at the age of seventy-five years. He was an active and much-esteemed member of the New York Entomological Society.

May, 1910

SOME NEW AMERICAN BEES.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Dioxys pomona, n. sp.

♂.—Length hardly 7 mm.; black, the thick flagellum dull reddish beneath, eyes sage-green, tegulae entirely piceous, wings strongly dusky; subapical lateral spines of the abdomen sharp and conspicuous. By its small size and general appearance this suggests *D. Rohweri* Ckll., compared with which it is more robust, with the head and thorax broader and less hairy, the tegulae without red (largely red in *Rohweri*), the wings considerably darker, the abdomen much more coarsely punctured, and with acute subapical spines. Compared with *D. Martii* Ckll., it is smaller, with narrower abdominal bands and dark tegulae. The tarsi are somewhat reddish, but not so red as in *Martii*; the spurs in both are red. The first r. n. joins the second s. m. some distance from its base. In spite of the greater superficial resemblance to *D. Rohweri*, the insect is most nearly related to *D. Martii*.

Hab.—Claremont, California. (C. F. Baker, 7221.)

HOPLITELLA, gen. nov.

A genus of small bees related to *Osmia*, *Hoplitis*, etc.; colours red and black, not metallic; wings dusky; stigma rather small, its part on marginal cell less than first s. m. on marginal; marginal rather obtusely pointed, away from costa; b. n. meeting t. m.; first r. n. joining second s. m. very close to base, and second r. n. about twice as far from apex; basal middle of first abdominal segment smooth and shining, not separated by a keel or ridge; maxillary palpi 5-jointed, the joints measuring in μ : (1) 70, (2) 102, (3) 120, (4) 85, (5) 50; the third is more slender than the second; labial palpi with the joints measuring: (1) 680, (2) 1260, (3) 70, (4) 153; the second is about 153 broad at apex; the third very short and stout, almost heart-shaped; the last slender basally, broadening apically; tongue reaching about to level of last joint of labial palpus; blade of maxilla very long and slender. Male with head and thorax finely punctured; labrum of the usual form, but only moderately long, its apical margin gently convex, the corners rather rounded; mandibles strongly bidentate; antennae simple, flagellum slender; cheeks moderate, occipital region of head not enlarged; sixth abdominal segment with a strong red tooth at each side, and its reddish hind margin slightly reflexed and shallowly emarginate in the middle; seventh segment broadly truncate, the truncation deeply notched in the middle; no ventral teeth.

Hoplitella pentamera, n. sp.

♂.—Length about $7\frac{1}{2}$ mm.; head, thorax and legs black; abdomen with the first three segments bright ferruginous-red, the second and third with a blackish stain in the middle; sides of fourth red, the others black; ventral segments with more or less evident white hind margins; face densely covered with long silky-white hair, stained with yellowish about the middle; eyes sage-green; flagellum slender, entirely black; mandibles black; ocelli large; thorax with rather long dullish white hair; area of metathorax smooth and shining; tegulae bright apricot colour; abdomen finely punctured, with poorly-developed white hair-bands; spurs creamy-white.

Hab.—Claremont, California. (C. F. Baker, 7224.)

Hoplitella shows many points of resemblance to *Proteriades* Titus (*P. semirubra* Ckll.), but is at once distinguished by the 5-jointed maxillary palpi, and the form of the labial palpi, and more superficially by the dusky wings.

Compared with *Chelostoma* (*Cephalapis*) *jacintanum* Ckll., it is easily known by the ordinary-sized head, bidentate mandibles, more slender marginal cell, merely emarginate seventh segment, etc.

Compared with *Osmia andrenoides* Spinola, from Algeciras (*Morice*), it is superficially very similar, though smaller; but *andrenoides* has a much longer tongue, the venation is different in several ways (thus, the first r. n. enters second s. m. a long way from base), the sixth abdominal segment has no lateral teeth, and the seventh is bidentate with a pair of triangular teeth.

Osmia semirubra Friese, from Jericho (*Morice*), also differs greatly in venation from *Hoplitella*. The b. n. in *semirubra* goes basad of the t. m., and the first r. n. enters the second s. m. far from its base.

Osmia remotula, n. sp.

♀.—Length about $6\frac{1}{2}$ mm.; broad, robust; head, thorax and legs black, with much white hair, becoming grayish dorsally, and pale yellow on inner side of tarsi; head broad, eyes sage-green; antennae short, entirely black; mandibles black; head and thorax minutely punctured; area of metathorax shining, dull and rugose at base; tegulae shining piceous; wings dusky, nervures black; venation as in *O. andrenoides*; spurs creamy-white; abdomen with the first three segments bright ferruginous-red, without bands, exactly as in *O. andrenoides*, except that they are more feebly sculptured; other segments black, with grayish-white

hair, which covers the apical one ; ventral scopa white, short. The female *O. andrenoides* compared is from Corfu (*Morice*).

Hab.—Claremont, California. (*C. F. Baker*, 7226). A representative of the group of *O. andrenoides* (subgenus *Erythrosmia* Schmied.), not before known in America.

Osmia (Gnathosmia) Louisianæ, n. sp.

♀.—Length nearly 9 mm ; agrees with Cresson's description of *O. Georgica*, and Robertson's additional diagnosis, except that instead of being "black, tinged with blue," it has the head, thorax and abdomen shining blue-green. The colour and general superficial appearance are as in *O. physariæ* Ckll., but the wings are very brown, whereas in *physariæ* they are clear. The mandibular processes are very large, forming, as Cresson says of *Georgica*, an arch interrupted in the middle. Legs black, the hind femora faintly submetallic in front ; tegulæ rufo-piceous ; ventral scopa long, light orange-yellow. The anterior coxæ are sharply keeled on the outer edge.

Hab.—Mound, Louisiana, May 4, 1905. (*C. R. Jones*, 234) *O. Georgica* Cresson, was based on a single female from Georgia. Since then Robertson has taken it in Illinois, and Professor Titus informs me that it occurs in North Carolina. It is possible that the present insect is only a variety or geographical race, but it seems more likely that the difference of colour indicates a distinct species.

A NEW ALEYRODES ON BEARBERRY

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Although the common bearberry (*Arctostaphylos uva-ursi*) is circum-polar in its distribution, the insects which affect it in America do not seem to occur in Europe. Examples occur among the Coccidæ (*Targionia Dearnessi* Ckll.) and Aphididæ (*Phyllaphis Coweni* Ckll.), and now I have to add a species of Aleyrodidæ, of which I found pupæ and an adult near the top of Flagstaff Mountain, Boulder, Colorado, March 20, 1910.

Aleyrodes ursorum, n. sp.

Pupa oval, pure black, 680 μ long, 518 broad ; a little white secretion around the base, but no distinct fringe, and no dorsal secretion ; the usual sutural cross lines present ; dorsal area bounded by a well-defined double margin, which, when the pupa is seen from above is 35 to 50 μ from the lateral outline ; margin strongly crenulate, the projections shaped as in *A. mori* (Proc. U. S. Nat. Mus., XXVII, pl. XXXII, fig. 39), but longer,

about four in 25μ of the margin; vasiform orifice about 25μ broad, short and rounded, with the broad entire margined operculum practically filling the orifices. In the table by Mrs. Bemis (Proc. U. S. Nat. Mus., XXVII, p. 485), this runs to *A. nigrans*, but differs in the regularly oval shape; the adult also is quite different.

Adult about 1140μ long; body above blackish, covered with white meal, the base and sides of abdomen white, the extreme base of wings yellow; beneath, the abdomen is light yellow, with the last two segments gray; eyes black, completely divided; wings white, each with a small dusky spot in the apical field, and also two very faint slightly iridescent clouds above the principal vein, one from the dusky spot toward the apex, the other apparently marking the place of the lost upper branch.

Nearest, I think, to *A. Dorseyi* Kirkaldy, but the dorsal area of the pupa is much more obtuse posteriorly than in that species, which occurs on *Rhamnus* in California. The adult of *A. Dorseyi* is unknown.

NOTES ON TENTHREDINOIDEA, WITH DESCRIPTIONS OF NEW SPECIES.

BY S. A. ROHWER, WASHINGTON, D. C.

PAPER X. — NEW SPECIES OF EMPRIA.

Lepeletier in 1828 (Encycl. Method, X (2), p. 571), described his genus *Empria*, and included three species, the first of which, *Dolerus* (*Empria*) *pallimacula* Lepeletier, was named as the type by Brullé (Hist. Nat. Ins. Hym. IV, pp. 666, 1846).

In 1835 Dahlbom, in his Conspect. Tenthred. Scandin., p. 13, No. VIII, founded the genus *Pacilostoma* for *Tenthredo guttatum* Fallén. Thomson, in 1871 (Scand. Hym. I, p. 227), changed the spelling of Dahlbom's genus, *Pacilostoma*, to *Pacilosoma*.

Dr. Ashmead, in his tables in the CANADIAN ENTOMOLOGIST for 1898 (p. 256), made *Haripiphorus maculatus* Norton, the type of a new genus, *Pacilostomidea* and *Monostegia ignota* Norton, the type of *Tetratneura* Ashmead.

Dolerus (*Empria*) *pallimaculata* Lepeletier, is the same as *Tenthredo guttatum* Fallén, and *Haripiphorus maculatus* Norton and *Monostegia ignota* Norton, are congeneric with *Tenthredo guttatum*, so the synonymy of the genus *Empria* is;

Empria Lepeletier, 1828.

Pæcilostoma Dahlbom, 1835.

Pæcilosoma Thomson, 1871.

Tetratneura Ashmead, 1898.

Pæcilostomidea Ashmead, 1898.

Rev. F. W. Konow (Zeit. Hym. Dipt., p. 36, 1908) published a similar synonymy for *Empria*.

Up to the present time a number of species of this group have been lumped under the name *maculata* Norton, but on studying these forms carefully and examining the saws there seems to be a number of allied but distinct species. At the present time a revision of this genus seems unadvisable, but at some future date such a paper may be published. It would greatly simplify matters if the various economic entomologists would refer their material to a specialist.

Empria distincta, n. sp.—♀. Length about 7 mm. Clypeus subtruncate, carina present but not strong; antennæ rather robust, the third joint a little longer than fourth; antennal furrows interrupted below ocelli; middle fovea circular and not connected with the ocellar basin; sheath obliquely truncate, angles rounded; saw with rather small teeth. Black; anterior margin of clypeus, pronotum, tegulæ, legs below coxæ, except the brown hind femora and tarsi, reddish-yellow; the usual abdominal spots. Wings hyaline, iridescent; venation dark brown.

Type locality: Virginia.

Type, No. 12833, U. S. N. M.

Empria affinis, n. sp.—♀. Length, 6 mm. Clypeus tridentate, shallowly emarginate, lobes small, sharp, carina strong; antennæ of the slender type, third joint longer than fourth; antennal furrows complete; middle fovea small, circular, deep, nearly connected with the ocellar furrow; saw with small teeth, the upper part not reaching apex; sheath with the lower margin strongly rounded. Black; extreme apical margin of clypeus, line on pronotum and tegulæ, knees and usual abdominal spots white. Wings hyaline, iridescent, venation dark brown.

Type locality: "Colo. 1041." Collection of C. F. Baker.

Type, No. 12834, U. S. N. M.

There are also some other Colorado numbers.

Empria Caudelli, n. sp.—♀. Length about 7.5 mm. Clypeus distinctly emarginate, lobes broadly triangular, carina wanting; antennæ

of the very robust type, third joint much longer than fourth; antennal furrows subinterrupted below ocelli; middle fovea circular, not separated from broad ocellar furrow; sheath rounded at apex; teeth of saw small, upper part ribbed and reaching to the tip. Black; line on pronotum and tegulæ, and legs below knees, white; the usual abdominal spots. Wings brown, venation brown.

Type locality: Cheney Gulch, Colorado, May 13, 1901. (Dyar and Caudell.)

Type, No. 12835, U. S. N. M.

Also some Colorado numbered specimens from the C. F. Baker collection.

Empria submaculata, n. sp.—♀. Length, 5 mm. Clypeus gently emarginate, lobes broad, triangular, carina wanting; antennæ of the normal slender type; antennal furrows complete; middle fovea small, circular, deep; ocellar furrow almost wanting; sheath slender and rather sharply pointed; saw sharp, teeth large in comparison to size of saw, upper part reaching tip, its margin somewhat irregular. Black; clypeus, line on pronotum, tegulæ white; legs below coxæ pale brown to white; usual abdominal spots. Wings hyaline, iridescent; venation dark brown.

Type locality: "Cana 2051." Collection of C. F. Baker.

Type, No. 12836, U. S. N. M.

Empria Arizonensis, n. sp.—♀. Length, 8 mm. Clypeus narrowing apically, middle tooth distinct, lobes broad, rounded at apex, carina strong; antennæ more robust than the slender type, but not very robust; antennal furrows complete; ocellar furrow and middle fovea making a diamond-shaped area on the front; head and thorax more shining than usual, sheath strongly rounded on the lower margin; saw with broad, rather large teeth, upper margin ribbed and reaching tip. Black; line on pronotum, tegulæ, knees and indistinct abdominal spots white. Wings and venation black.

Type locality: Arizona.

Type, No. 12837, U. S. N. M.

Empria salicis, n. sp.—♀. Length, 6 mm. Clypeus deeply emarginate, lobes sharply triangular, inner tooth faint, as is the carina; antennal furrows complete; ocellar furrow and middle fovea complete, making a broad furrow; antennæ of the slender type; sheath truncate, the upper angle sharp; saw with small teeth, the upper part extending to near the

apex. Black; clypeus, line on pronotum, tegulae and abdominal spots white; legs reddish-yellow, hind tibiae white at base, the apical part black. Wings hyaline, iridescent; venation dark brown.

Type locality: Florissant, Colorado. Specimens swept from *Salix brachycarpa* in June and July by S. A. Rohwer. There are also some Colorado numbered specimens in the C. F. Baker collection.

Type, No. 12838, U. S. N. M.

The male is very like the female, but has the usual sexual differences.

Empria melanostoma, n. sp.—*Pecilostomidea maculata* Kincaid, Wash. Ac. Sc., Vol. II, Nov. 24, 1900, p. 346.

♀. Length, 6 mm. Clypeus as in *salicis* Roh., but the carina is stronger; antennae of the short, subslender type; antennal furrows complete; middle fovea and ocellar furrow forming a deep, shining frontal furrow; sheath obliquely truncate, the angles rounded; saw with large teeth, the upper part reaching nearly to tip, the margin strong. Black; line on pronotum, abdominal spots and knees white; tibiae brownish. Wings hyaline, iridescent; venation dark brown.

♂. Length about 5 mm. Very like the female, except for the sexual differences.

Type locality: Sitka, Alaska, June, 1899. (T. Kincaid.)

Other localities: Yakutat, Alaska, June 21, 1899. (T. Kincaid.) Oregon (Koebele), "W. T."

Type, No. 12839, U. S. N. M.

Var. A.—♀. Edge of clypeus white; third antennal joint longer than fourth; emargination of clypeus broader and the lobes sharper.

♀, Ute Creek, Colorado, July 4, 1907, 9,000 ft. (R. W. Darson.)

Empria mellipes, n. sp.—♀. Length, 7 mm. Clypeus broad, subtruncate, carina nearly wanting; antennae short, subrobust; antennal furrows slightly interrupted below ocelli; middle fovea small, circular, indistinctly connected with the narrow ocellar furrow; sheath of the normal type, rounded beneath; saw with rather large hooked teeth, the upper part faintly ribbed and reaching apex. Black; pronotum, tegulae, indistinct spot on pleurae, legs below the coxae and the abdominal spots, which are large, reddish-yellow. Wings pale brownish; venation pale brown.

Type locality: Missouri. Specimen labelled "Straw. Apr. 14, 71 C. Mo."

Type, No. 12840, U. S. N. M.

LIFE-HISTORIES OF NORTH AMERICAN WATER-BUGS.—III.

BY J. R. DE LA TORRE BUENO, NEW YORK.

Microvelia Americana Uhler.

I.

In 1834 Westwood¹ placed *Velia pygmea* L., Duf.,² in a section or subgenus, which he called *Microvelia*. In the following year (1835) Burmeister³ erected a new genus to contain this species, and with the calm that characterized him, ignored Westwood's previous work and named the genus *Hydroëssa*. Entomologists of the German school to this day persist in the latter generic name, although Westwood's is universally recognized to have priority.

No North American species of the genus had been recognized till 1883, when Uhler⁴ described his *Hebrus americanus*, which a careful reading of the generic characterization shows not to be a *Hebrus* at all, but a true *Microvelia*. His description, however, leaves no doubt as to the insect he had before him. Nevertheless, he appears not to have considered this a sufficient description, or else recognized his initial error in placing the species in *Hebrus*, since he redescribed it as new in 1895,⁵ and this is the date commonly quoted.

Briefly, the synonymy is thus :

Microvelia Westwood, 1834.

Hydroëssa Burmeister, 1835.

Hebrus Uhler (not Curtis), 1883.

Veliomorpha Carlini, 1895.

Species : *americana* Uhler, 1883 (as *Hebrus*).

The species is widely distributed, and it has been recorded by various writers from Ontario, in Canada ; and from Maine, New York, New Jersey, Pennsylvania, Maryland, North Carolina, Kansas and Colorado, in the United States. It is probably spread throughout all the Atlantic and middle Western States, but possibly it does not range as far to the south as Florida and the Gulf States, where we should expect to find other species. California is also said to be within its range, but this at best is doubtful.

1. Ann. Soc. Ent. Fr., III : 647, Pl. VI, fig. 5.

2. Op. c., II : 115, Pl. V, fig. 6.

3. Handbuch Ent., II : 213.

4. Standard Nat. Hist., II : 273.

5. Bull. 31. Col. Agr. Exp. Sta., Hem. of Col., p. 61.

Many an entomologist when drinking from a field or roadside spring has noticed the tiny black, silver-spangled insects that detach themselves from the stones forming the basin and run across the surface, or glide out from the side and swiftly curve in to their former resting places. This is *Microvelia americana* Uhler. It is to be found on the banks of any body of water, moving or still. Where the walls of the spring or the bank of the stream or pond are more or less vertical, they perch a little above the water. But on shelving or sloping banks they wander about over the mud or pebbles seeking their prey, leaving the shore only when alarmed or disturbed. They also conceal themselves under overhanging banks of streamlets, as observed by Uhler in Maryland and the writer in New Jersey. I have found them perched on logs jutting out from the shore, and among the heaps of brush and twigs that gather in the slack waters and eddies of streams. In such places they pass the time from earliest spring till the bleak days of late autumn. I have secured adults just emerged from their hibernacula as early as March, and as late as the end of September have seen adults and nymphs, and in mid-October adults only. From then on, according to Uhler, "they hibernate in colonies beneath the overhanging banks of little streams (in the Middle States)" until the first warm days of spring entice them from their shelter. They must begin to breed at once, because, again quoting Uhler, "by the latter part of June they have become fully winged." I have myself noted the young in May, and taken nymphs arriving at the adult toward the end of July, which perhaps is as early as is normal in the latitude of New York. Of course, their precise time of appearance in the spring, and of seeking hibernacula on the approach of winter is largely governed by the temperature, and naturally varies with the latitude and the variations of the thermometer.

All the water-striders, large and small, are carnivorous, and *Microvelia* is no exception to the invariable rule. In nature they doubtless feed on such small insects as are tiny enough to be overpowered, such as Spring-tails, larvæ of flies, and other soft-bodied and feeble forms, or on those larger ones which are drowned in their haunts. In the aquaria they have been fed on house-flies, and where there have been water-fleas in the water, they have feasted on the unlucky ones imprisoned in the surface film. Like all the predaceous Heteroptera, they are always in a condition of semi-starvation, and when a living fly is fed them, of course they attack

it in force. When it struggles, they beat a hasty retreat; but if it quiets but for an instant they are on it again, piercing it at the joints of the legs or in the sutures between the segments, until the victim of their voracity perishes, exhausted by its struggles and unable to overcome the actively poisonous saliva *Microvelia* injects. Then all feast at their ease, some perched upon the carcase, others sucking at the joints, until they are filled to satiation. But at a pinch, when there are no living victims, they do not disdain long-dead and gamey food, and I have often seen them feeding on decaying flies, as much as two and three days old, and which smelt to the four winds.

In regard to their manner of progression, Uhler (l. c.) says it "runs with astonishing rapidity, but not with the rowing impulses of *Limnotrechus*," and Kirkaldy⁷ describes the gait of *Microvelia pygmaea* of Europe in these words: "Their gait may be described best as a 'scuttle,' a series of very quick short steps, the femora being almost horizontal. They move very rapidly, but rarely sustain the effort long—the opposite legs are moved alternately." He goes on to say that they apparently have very feeble adhesive powers, and are unable to mount a perpendicular glass surface, but this is only natural when it is considered that the claws are subapical, and that there do not appear to be any pulvilli. In the main, these two accounts cover *M. americana*, but in addition I have observed it to move with the rowing impulses of the other Gerrids. This, however, happens only when it is far from shore, or closely pursued and making desperate efforts to escape, and its ordinary gait is of no avail. This I have seen, but not very often, both in nature and in my aquaria.

The *Microvelia* are cleanly beasties, and indeed, the nature of their velvety covering and the many tactile and other hairs which abound on their bodies, make it imperative that they should keep themselves in good condition, and accordingly, a good part of their time is spent in cleaning themselves. Kirkaldy (l. c.) observed the toilette of *M. pygmaea*, and describes in detail how the legs are employed in the dry wash, and the careful manner in which the antennae are cleaned. In the macropterous adults, the wings are lifted and the legs passed under them. I have been so fortunate as to be able to observe *M. americana* in this tidying process more than once, and on one of these occasions careful notes were made while one of the little fellows in my aquarium was thus engaged, and this

7. 1899, ENTOMOLOGIST, Vol. XXXII, "A Guide to the Study of British Water Bugs (Aquatic Rhynchota)," p. 113.

is what he did : First, he rubbed the first pair of legs together, that is, the tarsi and tibiæ, and then each leg rubbed the other all the way down to the tarsi, much as a man washes his hands and arms. Then the middle leg of one side was vigorously rubbed against the hind leg, and then against the front. Then, with the front legs, the antennæ were rubbed quite vigorously, but always from the base to the tip, so as not to disturb the tactile hairs which all point in that direction. The middle legs were bent under, and the sternum and abdomen rubbed with the tibiæ. The minuteness and quick motions of the bug caused many points to be missed, but this is the process in its essentials. The reason for the use of the tibiæ is that all are furnished with a comb at the distal end, running crosswise of the leg.

In common with all the other Gerrids, *Microvelia americana* displays the phenomenon of apterousness, but in a very marked degree. Ordinarily, all the examples of *Microvelia americana* taken, or to be seen in collections, are wingless, but at times it is possible to get a few winged individuals in sheltered spots, under the overhanging banks of streamlets principally, or in exceptional seasons or situations. Thus, in the summer of 1907, there was a great abundance of winged individuals of normally apterous species to be found in the streams about White Plains, N. Y. Then I secured some dozen or so, seven in one limited area of perhaps 20 or 30 feet on one August day. The next summer, also in August, no less than 15 winged were taken in a roadside drinking trough, which was fed by a cold stream flowing from a hillside in a pasture. They were gathered in large numbers at the inlet end of the trough, where the water ran coldest. In the tropics the winged individuals are more abundant, as Westwood notes in his introduction, where he says Hope possessed a large number of *Microvelia pulchella* from St. Vincent, almost all winged.

Distant, in Hemiptera of British India, notes that Green has taken in Ceylon *Microvelia singalensis* in an acetylene moth trap. I have never got any of our species at light, but doubtless the fact will be recorded by some fortunate investigator in due time.

This little bug does not appear to be as amorous as its larger relatives of the *Gerrinæ*. According to the classification, of Gadeau de Kerville, of the ways of mating in Hemiptera,⁸ it comes under "accouplement par superposition," as in the *Gerrinæ*, and, in fact, in all the water-bugs I have observed. I was able to observe the act in some bred

8. 1902, Bull. Soc. Ent. Fr., No. 4, p. 68

aquarium specimens, which were only two days old, and the following notes were taken as they were watched through a magnifying glass. When the male in its wanderings ran across the female, he stood still behind her for an instant, taking aim as it were, and then started suddenly, running swiftly onto her back. When up, he held on by the front and hind legs, the tibiae of the first pair bent under and holding on to the shoulders of his mate. The hind pair were held with the femora at right angles to the body, the tibiae bent under, the extremities being under the edge of the female's abdomen, with the tarsi seemingly hanging limply down. The middle legs were held out from the body, the tarsi held up from the surface of the water, the object of this apparently being to aid in balancing the male on his precarious perch. While in this position the male positively quivered, the antennae and the middle legs actually vibrating with the intensity of his passion. The genitalia (but obscurely seen from above) were bent toward those of the female, where they could be seen vibrating. The female, of course, remained passive during the act. Three days later, that is to say, five days after reaching maturity, this bred female was quite swollen with ova.

In nature, the eggs are probably deposited on stones or sticks, just above the surface of the water, but not on vegetation, to judge from the preferences shown by the little bugs in the aquaria, which deposited their eggs on the sides, but not on the abundant duck-weed furnished them. In the course of some two or three weeks more or less, depending on the temperature, the nymphs emerge, and after five moults reach the adult in about five weeks. The females display no maternal solicitude, and the young nymphs fend for themselves from their tenderest infancy. No adult parasitism by mites nor egg parasitism by Hymenoptera has thus far been observed.

My first attempt to breed *Microvelia americana* was made in the summer of 1904, and two individuals were brought to maturity after five moults. No systematic notes were kept, other than a careful note of the number of ecdyses. In 1905, and again in 1908, more minute observations were made and a more careful record kept, my results being set forth in the following pages.

It is not a difficult task to breed *Microvelia americana*. My equipment consists of one or two large aquaria and an assortment of club-cheese pots, Stender dishes of various sizes, and screw-top, opaque, white glass pomatum pots, about an inch or an inch and a half across the top. The first and last named are preferable, because they offer a white

background, against which the little bugs are more clearly revealed, and therefore more easily observed. The adults were kept in numbers in the large aquaria, where they mated and oviposited, and the young, as soon as emerged, were transferred singly to one of the small dishes, where they could be observed and a more accurate record be kept of their transformations. Every morning before going to the office where I earn my living, the aquaria were examined, the cast skins removed, the moults noted, and any other pertinent observations recorded in the books I keep for the purpose. On my return from business a similar routine was gone through. It is necessary to keep the aquaria, large and small, covered to prevent evaporation, and also to keep the bugs from escaping, especially the smaller ones. With a water surface to run upon, and food in sufficient quantity, they require nothing more. A few water plants help to keep the water sweet and add sightliness to the large aquaria, but they cannot be successfully employed in the smaller.

All the descriptions and figures are from balsam mounts, and this perhaps may have caused some slight distortion in the form of the insect, making it possibly a little broader and longer than it really is. The bugs in the earlier series of slides were killed in alcohol (about 90%), washed in Cologne spirits (98% alcohol), and cleared in turpentine. In the latter, they were put living into carbol turpentine, made by putting crystallized carbolic acid into an equal part of fine spirits of turpentine, which gives excellent results, producing very clear mounts.

One fact should be borne in mind in these life-histories, which is that the conditions are largely artificial, and in all likelihood more favourable than in nature, and this may contribute to an acceleration of the life cycle as compared with that in natural surroundings. In the first place, the food supply is regular and abundant, which is not likely to be the case in *Microvelia's* normal haunts, for it is scarcely likely that in a secluded spring they can get a single insect each a day. And in the second place, the temperature is bound to be both higher and more constant in the confinement of a closed aquarium, and the air is more heavily moisture-laden as well. A regular and abundant food supply, high temperature and a moist atmosphere are all conducive to rapidity of development in the Heteroptera, as may be readily verified by observing how much more quickly bugs reach their moults in the hot, humid days of July and August than they do in the cooler May, June, September and October.

II.

Between August 20th and 27th, in 1905, the *Microvelia americana* in my aquaria mated and began ovipositing. A portion of the eggs were attached to the upper surface of some duck-weed floating on the water, while a few were dropped on the surface of the water itself. The majority, however, were embedded in a colourless waterproof jelly, and fastened in masses to the sides of the aquarium, slightly above the water. Subsequent observations confirm this mode of ovipositing, and in the absence of direct observations in nature, I should say the eggs are deposited on rocks and stones, just above the surface of the water, or else on floating sticks.

Ovum.--Ellipsoid in shape : colour, translucent white, more or less glairy. Under the microscope the chorion is seen to be sculptured in irregular hexagons. Dimensions by camera-lucida and scale : .6 x .25 mm.; .63 x .24 mm.; .63 x .22 mm.; .68 x .29 mm.; .725 x .27 mm. (Fig. 12.)

As development progresses, the eggs grow darker, and at one end the red eyes, the legs, the rostrum, etc., of the nymph are visible through the shell. At the end of about 17 days the eggs hatch, and the young nymph emerges by a longitudinal slit about two-thirds of the length of the egg, along one side and the end.

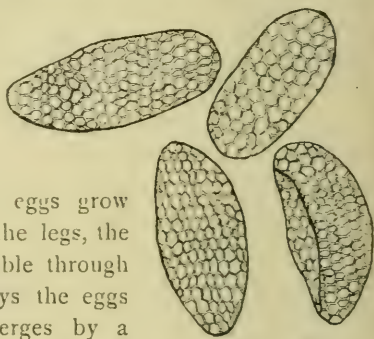


FIG. 12.—Ova of *Microvelia americana* (x 27).

Nymph.—1st Instar : Head, long.: lat.: 15 : 22 ; eyes : vertex :: 6 : 10 : 6 ; antennal joints, 1, 2, 3, 4, 5 : 6 : 5 : 15.

Antennæ 4-jointed, 1st curved and stout ; 2nd straight, a little stouter than the 1st : 3rd slenderest ; 4th fusiform, slightly slenderer than the 2nd, but as stout or a little stouter than the 1st, all thickly covered with long hairs, one long stout hair near the distal end of the 1st joint set in a sense pit and pointing outward ; inserted under the head. Eyes exteriorly rounded, set obliquely in the head, occupying a little over one-half the head. Head thickly pilose. Rostrum 4-jointed, rising under the head. Proportions of joints : j1 : j2 : j3 : j4 :: 26 : 7 : 60 : 40. The second joint is annuliform, and the 4th darker and apparently more heavily chitinized than the others. The tylus is slightly prominent. In moulting, the lancets are cast with the skin.

Prothorax clearly indicated, ring-like ; long.: lat.: 5 : 25, in shape something like a curving collar of even width, sides rounded and sloping

forward, thickly pilose. Prothorax and mesothorax fused into one, but an effaced suture visible between them; thickly pilose.

Legs: First pair shortest, 3rd longest. All tarsi single-jointed, claws long, simple, slender, subapical, extending as far again from the tip of the tarsus as the tarsus projects beyond the insertion of the claw. Coxæ and trochanters much elongated in the third pair. First tibiæ with two combs, second with one, apically situated; third tibia with a long stout subapical spine. First pair of legs, femur longest, then the tibia, then the tarsus, which is stouter than the other two; second pair as the first: third pair, tibia longest, femur next and stoutest, then tarsus, which is more slender than either; all covered with long hairs.

Abdomen oval, segments well marked, genital segments prominent; all the segments dark, except at the connexivum, which is wholly light; eight apparent segments. The spiracles are seemingly not to be found in this instar, not being visible in either the entire nymph or in the cast skins mounted in balsam, even at a magnification of 530. This, of course, is not a proof that they do not exist, but rather shows how well they are concealed.

Dimensions: Length, .75 mm.; width, .42 mm., measured from living bug.

After five days the tiny bug moulted the first time.

Nymph.—2nd Instar: Proportions of head: long.: lat.: 7: 10: eyes: vertex: 14: 32: 14; antennal joints, 1: 8: 9: 20; rostral joints, 9: 3: 13: 10.

The rostrum extends to the base of the prosternum, or to the insertion of the first pair of legs.

Prothorax, lat.: long.: 38: 6.

First pair of legs stouter than the other two: the tarsal combs of the first and second pair as before; the third tibiæ armed with a stout double-pointed spine, apically and exteriorly, and some stout scattered spines interiorly, beginning half-way up the tibia. The end of the tarsus extends beyond the middle of the claws.

The abdomen and other details omitted are as in the first instar.

Dimensions: Length, .9 mm.; width, .55 mm., taken from balsam mount of nymph.

In four, five and six days respectively, the nymphs moulted the second time.

Nymph.—3rd Instar: Proportions of head: long.: lat.: 23: 35: eyes: vertex: 7: 21: 7; antennal joints, 12: 10: 11: 21; rostral

joints, 6 : 6 : 19 : 9 (measured from cast nymphal skin) ; prothorax, lat. : long. : 6 : 42. The antennæ and legs grow comparatively slenderer, but the number of joints does not change. The cleft spine on the outer side, subapically, of the posterior tibiæ still persists. The other details omitted are as in the previous instars.

Dimensions of nymph, taken from balsam mounts : Length, 1.32, 1.20 mm.; width, .8 to .72 mm.

Four, five and six days later, respectively, they moulted the third time.

Nymph.—4th Instar : Antennal joints, 12 : 9 : 10 : 24 ; rostrum, rostral joints, 7 : 6 : 17 : 9.

Owing to having nothing but moulted skins, a number of details must be omitted in this and the next stage of the nymph. The general form, aspect and coloration are as before, the main changes noticeable being in the increasing slenderness of the legs and antennæ. In this and the preceding instars, the spiracles can be seen in the cast skins, as little round openings in the connexivum. In the entire bug I have not been able to locate them. The basal joint of the antennæ is stout and curved, as before, and there is no change in the relative thickness among them. The other details are practically unchanged. The first pair of legs is the stoutest, especially as to the tarsi, and these are single-jointed in all the legs.

The fourth moult took place two and four days after the third.

Nymph.—5th Instar : Antennal joints, 20 : 13 : 13 : 35 ; rostral joints, 6 : 4 : 21 : 10. With slight differences, the other details are as before. The tarsi continue single-jointed, with long, simple claws, the posterior tibiæ are spined toward the end, the spines increasing in number from the femoral to the tarsal extremity, and stout in proportions. The cleft spine mentioned before is still present, but is not so noticeable. In this instar, though still greenish in colour, with darker spots, lines and markings, the silvery patches, so characteristic of the adult, first make their appearance. The female can in this instar be already distinguished from the male on account of its larger size, and less prominent genital segments. The males are so much smaller in this instar than the females, that they may be mistaken for nymphs in the fourth instar only. The dimensions of the nymph, taken from the cast skins, mounted in balsam, are not quite accurate, as the skins are much distorted. Length, 2.14 mm.; width, 1.25 mm. The fifth, and last moult, took place seven, eight and ten days later, respectively.

In moulting, the skin of the head splits along the eyes, and rises like a lid at the front. In the body, it splits longitudinally along the middle line of the thorax, and down the dorsum to the third or fourth abdominal segment. As mentioned before, the rostral lancets are moulted entire, including their insertion in the interior of the head, as well as the tracheæ. In this connection, it may be mentioned that the cast skins are excellent for the study of the hairs and other external characters, the number of antennal and rostral joints, etc.

Adult.—The following proportions and dimensions are apparently not mentioned by the describer of the species. Antennæ four- or five-jointed, the latter if the minute jointlet between the second and third joints is to be taken into account. Proportion of joints, approximate, 24: 17: 2 + 22: 27, from balsam mount, somewhat distorted; these proportions are only approximate, as different specimens differ slightly from each other, and even the right and left antennæ are not alike. A dry specimen, mounted for the cabinet on a paper point, gave these proportions: 23: 16: 2 + 23: 30. The first joint is stout, curved; second not so stout; third slenderest; fourth fusiform, stouter than first. The stout tactile hair in the sense pit near the apex of the first joint still persists in this adult. The rostrum is four-jointed, as in the nymphal instars; the proportions are: 8: 4: 27: 13; head, length: width:: 30: 45; eyes: vertex:: 11: 22: 11. The ommatidia are round, as they are not as close together as in the compound eyes of other Heteroptera, and this is also the case in all the nymphal instars.

In the wingless form, the pro-, meso- and metathorax are clearly indicated as rings. Including the genital, there are nine apparent segments in the male, as seen from above. The spiracles are hidden on account of the extreme hairiness of the bug. The legs have a tibial comb on the first and second pairs, as in the nymphs. The peculiar cleft spine of the posterior tibiæ, so noticeable in the nymphs, appears to be single in the adult, and there is now interiorly a comb-like arrangement of close-set spines, thick hairs, or bristles.

When the adult is just emerged from the nymphal skin, it is a creamy white, with dark eyes, claws, etc. This is the case also with the nymphs.

In the nymphs, the third antennal joint appears to be sunk in a deep, cup-shaped depression in the second joint, and there is a minute jointlet entirely concealed in this depression. This structure does not appear till the second instar, the joint appearing pedicellate in the first. In the adult, however, the jointlet does not appear to be sunk in this manner.

In my descriptions above. I have included this jointlet as a part of the third, because, in fact, I have taken no account of it, the dimensions of this joint being taken as that part of it from the tip of the second joint to the insertion of the fourth.

A male and a female *Microvelia americana*, which came to maturity on October 2nd, mated on the 4th, and the female was noticeably swollen with ova by the 5th. On December 31st of that year, the female died, being under artificial conditions, and without food, but not before depositing several batches of eggs, which hatched out in due course, yielding nymphs which in some cases attained the first and second instars. The males lived on into January, when they too perished, after being fed no flies for over two months.

Summarizing, the bred insects had seven instars, one embryonic, five nymphal, and one adult, which took between 36 and 46 days for accomplishment. This would make possible several broods in the course of the year. Assuming that the ova are deposited about the middle of April, which would not be any too early in a normal spring, there would be adults from these by June 30th, which in turn breeding, would give a generation maturing about the first half of July; this brood would in turn reproduce itself, and adults would be forthcoming, since the season would be at its most favourable time for quick development, say by about the same time in August. The August progeny, in due course of nature, would see another generation under the favourable weather conditions of that period of summer, including the dog-days, by about the same time in September, and these, reproducing themselves, would by the end of October know that the generation to carry the species to the next year had attained its growth. We thus see that there may be as many as five generations in the course of a single summer. This, however, seems to me the least that they would do. As a matter of fact, it is scarcely possible to compute what would actually occur in nature, because, since oviposition is practically continuous, and one female may live say for a month while ovipositing, there is any number of overlapping broods to contend with, but it seems to be reasonable to estimate them as an average of five a summer, or possibly six.

In conclusion, I wish to point out that this species, *Microvelia americana* Uhler, may turn out to be the type of a new subgenus, characterized by having the anterior tarsi single-jointed, and the two others two-jointed, as opposed to *Microvelia* proper, which is said to have the tarsi two-, three-, three-jointed. For this I propose the name KIRKALDYA, in memory of my friend.

BOOK NOTICE.

GENERAL BIOLOGY: A Book of Outlines and Practical Studies for the General Student. By James G. Needham, Ph. D. Comstock Publishing Co., Ithaca, N. Y.

Although not customary in an entomological journal to notice biological works of a general character, it seems justifiable in the present case, in view of the many illustrations of biological phenomena, taken from the insect world, which the author has introduced into this attractive work.

The book is wholly unlike the ordinary text-books of zoology and botany, in that it is not dominated by any special phase of the subject, but touches upon the entire field; its aim being to guide the general student in following the course of practical studies which it offers rather than to supply him directly with all the knowledge he is expected to acquire.

Each of the seven chapters forms an introduction to some branch of general biology, which is illustrated by references to familiar examples, and the practical exercises which they contain are not studies of animal types but of the biological phenomena in question. These practical studies contain directions for obtaining and preparing the necessary material, as well as for the intelligent study thereof. They are full of valuable suggestions, not only for the student, but for the instructor, and will be found most useful for teachers of biology, entomology and kindred subjects, in both high schools and universities.

The arrangement of the subject matter is somewhat novel, as indicated by the following list of headings of the seven chapters:

- I. The Interdependence of Organisms.
- II. The Simpler Organisms.
- III. Organic Evolution.
- IV. Inheritance.
- V. The Life Cycle.
- VI. The Adjustment of Organisms to Environment.
- VII. The Responsive Life of Organisms.

All the chapters except the second contain many references to insect biology. The first discusses the relations between flowers and insects,

and those between ants and aphids, and the interrelations of gall insects. In the third homology and phylogeny are illustrated by studies of the wing-veins of three series of closely allied insects. In Chapters V and VI, as the headings suggest, entomology takes a prominent part. A special feature of Chapter VI is a number of practical studies of aquatic animals, mainly insects, which are particularly well suited to the study of secondary adaptations to environment. As examples of these studies may be mentioned the following :

“The principal types of gills found in aquatic insects.”

“The comparative development of respiratory apparatus in aquatic insect larvæ.”

“A comparison of the structure of ground beetle and diving beetle.”

“A comparative study of the size and activities of diving beetles.”

“Field observations on diving beetles.”

“The adaptive structures of diving beetles.”

Animal coloration is also chiefly illustrated from insects, and forms the subject of one of the practical field studies. It is treated under four headings: Resemblance, Flash Colours, Warning Coloration and Mimicry, each of which is illustrated by examples easily obtainable by the general student.

In the last chapter, which deals mainly with psychological phenomena, the nature of instinct is analyzed by experiments on the reactions of caterpillars in different bodily states to various stimuli, and on the case-building habits of caddis-flies.

In the appendix, in which directions are given for handling the microscope, dissecting, etc., a key to the genera of North American Dytiscidæ is included as an aid in the studies of diving beetles mentioned above.

The book is eminently readable, the style being lucid and vigorous, and is fairly free from typographical errors. The numerous illustrations are largely original, and include a number of good photogravures.

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NOCTUID NOTES.

BY F. H. WOLLEY DOD, MILLARVILLE, ALTA.

Xylina Treit. (*Graptolitha* Hübn., Hamps. Cat.).

Amongst the many errors in nomenclature brought to light by Sir George Hampson's most valued work on the Noctuidæ, is one concerning two of our commonest eastern *Xylinas*.

In 1871 Riley described what he believed to be a very variable species as *X. cinerea*. In 1874 Grote recognized that the name referred to a mixture of species, and choosing a specimen of one of them as a type to hold Dr. Riley's name, described another form as *laticinerea*. In 1879 Prof. Fernald discovered that Walker's *antennata*, which had been described in 1858 from an unknown locality, came from North America, and was the species chosen by Grote to hold Riley's name, which therefore sank. Grote made the reference, and at the same time tentatively separated and described a third form from the group as *cinerosa*. Then Riley, finding *cinerosa* preoccupied in the genus by a European species of Guenée's, cited *Grotei* as the name to be used for Grote's *cinerosa*.

The foregoing is old, and well known, but Sir George Hampson's changes are more recent, and as yet but little known. The European *cinerosa* Gn., has now turned out to be a synonym, and Hampson therefore restores Grote's name in place of the long familiar *Grotei*. But he has also shown us that hitherto Grote's two species have generally stood reversed in collections, and that the large gray-sprinkled species, with whitish contrasting orbicular, and without brown in reniform, is really *cinerosa* = *Grotei*, and that *laticinerea* is the smaller, less gray, and more common species, of which *Winnipeg* Smith is correctly referred by him as a synonym. I have studied the types of all the above names. The variation is apt to be confusing, and *cinerosa* and *laticinerea* appeared to me to be mixed at the British Museum as elsewhere, but the type of *laticinerea* is figured by Hampson, and a specimen like the type of *cinerosa*, and both figures are easily recognizable. The synonymy now stands;

<i>Nylina cinerosa</i> Grt.	} Large, gray-sprinkled; orbicular whitish, contrasting. No brown in reniform.
<i>Grotei</i> Riley	
<i>laticinerea</i> Grt.	} Smaller, duller, orbicular scarcely contrasting, usually with brown in reniform.
<i>Winnipeg</i> Smith	
<i>antennata</i> , Walk.	} (No change.)
<i>cinerea</i> Riley	

The characters given for the first two species were designated by Grote himself. Holland's figure of *laticinerea* happens to be correct, but in Prof. Smith's monograph, Pl. v, figs. 29 and 30, the names are reversed.

A species standing wrongly under *Winnipeg* in collections, and often mixed with the true species, is the Manitoba form of *animada*, which is rather more strongly marked than typical.

X. hemina Grt.—This name has long been applied to *disposita*, from which it has been thought questionably distinct. Nearly all the specimens I have seen standing in collections as *hemina*, I believe to be *disposita*. At any rate, none have been *hemina*, the two being really quite unlike, as my notes on, and Hampson's figure of the type of *hemina* show. Though I have known *disposita* for long, until I saw the type in the British Museum about a year ago, I had never seen *hemina*. My notes on the type tell me that it is a strigate species, and "so unlike *disposita* that comparison is superfluous." The type comes from Lewis Co., N. Y., and it appears to be a very rare species. Though I have seen several of the principal collections, I have not yet identified this with certainty in any of them. Grote in his description says that it is longer winged than *disposita*, with "spots and lines less distinctly limited, and more as in *petulca*." He adds that it has a peculiar general resemblance in ornamentation and colour to *Hadena vulgaris*. The type, a male, came from the Hill collection, which contained other specimens. Where that collection now is, I have not heard. Smith's Monograph, Pl. iii, fig. 2, called "*hemina*, melanic form," I rather suspect of being a pale *oriunda*. Fig. 4 I should call about normal *petulca*, and the same as fig. 13, called *rignosa*, a name of which I cannot at present arrive at the true status.

Teniocampa Gn. (*Monima* Hbn.; Hamps. Cat.)

It will come, I fear, as a shock to many, to learn that both the names *alia* Gn., and *pacifica* Harv., are everywhere wrongly used. The type of *Teniocampa alia* Gn., is a good specimen, a female, in the British

Museum. It was described in 1852 from "U. S. A." It is the common and widely distributed species hitherto everywhere known as *Hadena suffusca* Morr., described twenty-three years later, of which, however, I have not yet seen the type. Assuming *suffusca* to have been correctly identified, *alia* Gn., which has smooth eyes, and is therefore not a *Tæniocampa*, has priority.

The next name up till now in the synonymy of *alia* being *hibisci* Gn., that must be used for the common eastern *Tæniocampa*. I have not seen the type, but merely assume that it has been correctly referred, not to *alia*, but to the species we have mistaken therefor. Hampson's figure of *alia* is not of the type, but the species I now call *hibisci*. Whether Guenée intended the name *alia* to apply to the species which bears the type label may be open to question. I have not seen the description, but am guided by the type. Though the *Tæniocampa* sometimes resembles *alia* in colour, and they have a similar subterminal line and shade, they can scarcely be confused by anyone acquainted with both, even apart from generic characters. From the foregoing it follows that Holland's figure of *alia* should be called *hibisci*.

In 1874 Dr. Harvey, or more probably perhaps really Grote, under Harvey's name, described *pacifica* from Sanzalito, Calif., comparing it to *alia*, undoubtedly meaning thereby, not the *Hadena*, but *hibisci*. Harvey's name has also been wrongly applied to a very common and widely distributed British Columbian form which intergrades in Alberta with *hibisci*. His type is a female in the British Museum, where there are four other similar Californian specimens, and one from Vancouver Island. Other true *pacifica* that I have seen are, one in my own collection from Oakland (which is close to the place repeatedly called "Sanzalito" in Hampson's Catalogue, though I believe Sancelito is correct); one in Prof. Smith's collection labelled "Canada"; and a male from Victoria, B. C., in the Neumogen collection at Brooklyn. I may have seen one or two more, but can find no note of them at present. It is evidently a very rare species. It is characterized by the paler colour, obsolescent orbicular, narrow, somewhat constricted reniform, contrasting with the pale, even ground, but not conspicuously pale ringed, and a slight w in the s. t. line, which is preceded by a narrow dark band of even width.

The common B. C. form hitherto passing as *pacifica*, as it intergrades with the eastern *hibisci* in Alberta, I cannot recognize as distinct, though on the B. C. coast it is certainly a well-marked local race. In view of this fact, and as it has for years passed as a species, being larger and far

brighter coloured than eastern specimens, I propose the racial name *latirena*, which will serve to distinguish it from *pacifica*. I consider no description necessary, and make no type. Hampson does not figure the type of *pacifica*, and his figure under that name is *latirena*.

Quinquefasciata Sm. (Journ. N. Y. Ent. Soc., XVII, p. 65, 1909), is a well-marked form of *latirena*, with distinct cross-lines and ventral shade, which I have had in my collection for fifteen years, and have often vainly tried to separate out as a species. I am no better able to do so after seeing the types, and believe it to be merely a varietal form, occurring throughout the range of the *latirena* form of *hibisci*.

The synonymy of the above mentioned species will now stand :

Hadena alia Gn.

suffusca Morr.

Tæniocampa pacifica Harv.

“ *hibisci* Gn.

a. *latirena* Auct.

b. *quinquefasciata* Sm.

T. mecrona Sm. (Journ. N. Y. Ent. Soc., XVI, p. 95, 1908). A good species, I believe, described from Kaslo, and recognized by Mr. Cockle and the writer two years before. It is the “grayer and smoother first brood of *communis*” referred to by Dr. Dyar in the Kaslo list, and a large number of the co-types of *communis* are *mecrona*. I have separated them in the Washington collection. It is characterized by being slightly larger and longer winged, less red, having cross-lines fainter, orbicular usually larger and rarely dark-centered, and less of shade before s. t. line. The two are very close allies, and must be well studied in good series to be separated. I have a specimen from Oakland, Calif.

T. Smithii Dyar, its author refers, in Proc. U. S. Nat. Mus., XXVII, p. 868, 1904, as “at least a different race from *communis*.” The female type at Washington is from “N. Ill.,” and I believe it to be the same species as Morrison’s type of *incinata*, male, without locality, in the same collection. It is a broader winged species than *communis*, with male antennæ bipectinate with rather long branches. A Colorado female there in the *incinata* series, and one from Mr. Val. Fernaker (? Wisconsin), as well as type *Smithii*, have double pale-filled t. a. line. Type *incinata* and a ♀ “N. Ill.” have it single, but they seemed to me all one species.

T. alurina, Sm.—The type is a Chicago male in Prof. Smith’s collection, where there is also a male from Pittsburg, Pa. It is an ally of

hibisci, but is broader winged, and has more strongly serrate-fasciculate antennæ, almost pectinate, as mentioned in the description.

T. saleppa Smith (Trans. Am. Ent. Soc., XXXIII, p. 132, 1907.)—Described from Wellington and Victoria, B. C., as a close ally of *præses* Grt. Prof. Smith has in his collection two short series as *præses* and *saleppa*, including the type of the former, and B. C. specimens under both. Those under *saleppa* are paler and more ochreous than the rest, but I am unable to recognize two species, and do not think that B. C. collectors can do so either.

MOSQUITO OBSERVATIONS.—CONTINUED.

BY C. S. LUDLOW, PH. D.

Army Medical Museum, Washington, D. C.

In an article published last year* I described the female of *Oculiomyia Fulleri* mihi, and since then have received several specimens of each sex. The male resembles the female closely in colour markings, but it is of some interest to note that in each of the three males the verticels of the antennæ are in part specially developed. In one instance the 6th and 7th joints show them short, heavy, wrinkled and scale-like; on the other two specimens the 6th, 7th and 8th joints have the verticels altered in this way, while in one of these, on one antenna, the verticels at one joint appear as long slenderly spatulate flat scales about half as long as the normal verticels. The specimens are, as a whole, in bad condition, only one leg remaining on the males, and as it broke off before I noticed its attachment I cannot be sure which it is; the ungues on it are unequal and simple.

There have also been received two apparently new forms, described below, and the female of *Popea lutea* mihi, the male of which was described† in 1905, and no other specimens received until this year.

Popea lutea mihi (female).

The general markings agree well with those of the males, but are, as a whole, darker.

Antennæ brown, white, unscaled at the joints, basal joint testaceous, 1st joint with many dark brown flat scales, verticels and pubescence brown or light, according to the direction of the light; palpi short;

* New Philippine Mosquitoes. Can. Ent., Mch., 1909.

† Mosquito Notes, No. 3. Can. Ent., Mch., 1905.

mottled brown and light yellow with aggregations of light scales at the apices of the ultimate and penultimate joints simulating bands; proboscis mostly yellow, base dark brown, and an irregular band of dark brown at the apical portion; labellæ light.

The abdominal markings vary greatly in both sexes; in some specimens the males have a nearly pure yellow abdomen with narrow dark brown apical bands, while in others the abdomen is much darker, the "spots" only being light; the females are darker than the males, but even then vary much, being often dark with small median yellow spots and very small white apical lateral spots, the last two segments mostly light, sometimes with a narrow sub-apical dark band. Sometimes the median spots are white, and there are two submedian nearly apical yellow spots making a suggestion of triangular marking, the base towards the apex of the segments, and the small lateral white spots are extended into a very narrow cephalocaudad line on most of the segments. The ventral tufts are not so pronounced as in the male and could easily be overlooked; the venter is yellow with apical brown bands.

Legs as in the male, but the last joint in either may be yellow with a dark basal spot or band. Ungues are uniserrate on all the legs.

Wings as in male, but darker.

Stegomyia nigritia, n. sp. (female).

Head dark brown, closely covered, except the very tip of the vertex which is partly white, with dark brown flat scales and a few brown bristles; antennæ brown, verticels and pubescence brown, basal joint brown with a few white flat scales; palpi dark brown, ultimate joint and apex of penultimate brilliant white; proboscis dark brown; clypeus dark brown; eyes dark brown.

Thorax dark brown; prothoracic lobes with brilliant white flat scales and brown bristles; mesonotum with dark brown slender curved scales, and a line of brilliant white scales at the lateral margin extending cephalad from the wing joint almost continuously to the prothoracic lobes, and partly on the pleura; pleura brown with a few bunches of white scales and the line just referred to at the junction of the mesonotum; scutellum with brown flat scales; metanotum brown.

Abdomen: Dark brown with dark brown scales and brilliant white lateral spots sometimes extending across the tergum as very narrow basal bands, venter brown with basal sub-median brilliant white spots.

Legs: coxæ and trochanters all mottled brown and white scales; fore femora dark brown with apical white spot, tibiæ dark, 1st and 2nd tarsal joints with tiny basal white spots, remaining joints dark; mid-femora dark with narrow light line ventrally, apex white, tibiæ dark with very small basal white spots, 1st and 2nd tarsal joints with small basal white spots, and a couple of white scales at base of third joint on one leg, the rest dark; hind femora white at base and as a line on cephalic aspect to near the apex, apex white, tibiæ dark with tiny basal white spot, 1st, 2nd, 3rd and 4th tarsal joints dark with broad white basal bands, last joint pure white.

Wing: brown scaled; cells rather long, 1st submarginal distinctly longer and about the same width as 2nd posterior; base of third long vein and mid cross-vein meet and of about equal length, posterior cross-vein a trifle longer and distant more than twice its length. Halteres dark.

Length 5 mm., without proboscis.

Habitat, Cottabato, Mindanao, P. I.

Taken December.

Described from two quite perfect specimens sent by the Surgeon at the Post.

The mesonotum suggests *D. fusca*, Theob., but the third long vein is not carried back, and the leg markings are, of course, quite distinctive.

Culex ? aureopunctis, n. sp. (female).

Head brown, covered with ochraceous curved and lateral flat scales, many dark brown fork scales, a line of yellow scales around the eyes, a couple of yellow bristles between the eyes and many brown ones projecting forward around the eyes. The head does not seem at all denuded, nevertheless there is a bare median V-shaped space, the base at the vertex. Antennæ dark brown, white banded at the joints, verticels and pubescence dark brown, basal joint brown; palpi dark brown with some pale scales; proboscis apparently has the apical third partly denuded, but the remaining scales show dark brown with a deep ochraceous band near the apical third especially well marked on the ventral side, labellæ dark; eyes brown with red-gold reflections; clypeus brown.

Thorax dark brown; prothoracic lobes with light ochraceous scales and brown bristles; mesonotum covered with dark brown curved scales and a few golden yellow ones which make a broken line from the wing joints to the prothoracic lobes at the junction of mesonotum and pleura, and a faint line on either side of the "bare space" running cephalad

from the scutellum about half the length of the mesonotum, where they terminate in two brilliant round yellow spots, also a faint median spot near the nape, heavy bunches of brown bristles on either side of the "bare space" and at the wing joint; pleura brown with some pale scales; scutellum brown with bright ochraceous curved scales and many brown bristles; metanotum brown.

Abdomen brown, closely covered with brown flat scales and a few apical ochraceous ones on the 4th, 5th and 6th segments, making minute apical bands on the two latter, apical hairs ochraceous, venter ochraceous, with dark apical bands, the ochraceous scales extending on the seventh segment so as to form small lateral spots visible on the dorsal aspect.

Legs: Coxæ brown with pale scales, trochanters with ochraceous scales; all the femora with very dark brown scales, speckled or mottled with ochraceous spots, ventrally ochraceous and with an apical ochraceous spot; tibiæ dark, mottled with ochraceous spots, the bases and apices very narrowly ochraceous-banded, and in some lights the whole tibia looks fawn-coloured; all the femora and tibiæ with many dark brown bristles; all the tarsi very dark, but in some lights appear fawn-coloured. Fore and mid ungues with a tiny basal protuberance, hardly a tooth, hind ungues simple.

Wings: Clear, with very small brown scales; indeed, for the size of the insect all the scales are small; the median scales rather heavy and *Teniorhynchus*-like, the lateral scales linear. The apex of the wing is densely scaled, but the base of the sixth and third long veins have apparently never had any lateral scales, though there are a few at the apex of the sixth, and the apical half of the third is rather densely scaled. The costa shows a delicately spinous effect. The cells are long, nearly double the length of the stems, and the first submarginal is longer and narrower than the second posterior cell, their bases nearly on a line; the root of the third long vein and the mid cross-vein meet and are of about equal length, the posterior cross-vein is about one-quarter longer, and is directed slightly backward and only a little interior to the mid. Halteres are dark, the knob darker than the stem.

Length, 7.5 mm., without proboscis.

Habitat.—Cottabato, Mindanao, P. I.

Taken December.

Described from one nearly perfect specimen sent by Capt. Eastman, M. C., U. S. Army. It is a large species, and in the hand is a rich reddish-brown, the two yellow spots on the thorax being very noticeable.

NOTES ON OUR EASTERN SPECIES OF THE MAY-FLY GENUS *HEPTAGENIA*.

BY NATHAN BANKS, EAST FALLS CHURCH, VA.

The May-fly genus *Heptagenia* is a very well marked one, in the form that Walsh used the name. Eaton split up the genus into several, none of which are readily identified; most of these genera are based on secondary sexual characters, which I cannot recognize as of generic value. *Epeorus* (with *Iron*) is perhaps the most distinct group, and may yet be used in a subgeneric sense, if some character can be discovered to support it. In the male the basal joint of tarsus I is subequal to the second joint, and in most of the species the setæ are brown, not marked with black at tips of joints; however, in *H. (Epeorus) modestus*, described below, the setæ are as in other *Heptageniæ*.

It may be remarked here that in *Heptagenia* every alternate joint of the setæ is unmarked or only faintly marked at its tip; whereas in *Siphonurus* every joint of the setæ is equally marked with black at its tip; this enables one to readily distinguish the setæ of these two genera, when, as frequently happens, they are broken off in a vial or box containing both genera.

I have added the description of one Californian species of *Epeorus*.

The following table of the Eastern species of *Heptagenia* (except *Epeorus*) applies to the males; females, however, will, in some cases, also run out correctly. There are several species described from the Eastern United States or Canada that I have not identified; and one or two of my identifications are somewhat doubtful to me, especially *H. simplex*. The form I have from Washington may very possibly be a new species allied to the true *H. simplex*.

1. Thorax with a broad dark median stripe, or two narrow stripes close together, male with basal joint of tarsus I longer than apical joint *H. verticis*.
 Thorax without dark median stripe 2.
2. Tips of hind wings distinctly dark; beneath the bulla the cross-veins are more numerous than elsewhere and faintly clouded. *H. vicarius*.
 Tips of hind wings not darker 3.
3. Anterior margin of head black; colour pale yellowish, with black spots on the pronotum and pleura, no dash in wings *H. marginalis*.
 Anterior margin of head not black, though there may be black spots above it 4.

4. Two black spots or a band on face under the antennæ ; femora banded in the middle.....5.
No black spots on face under antennæ7.
5. No dash in wing ; about two cross-veins margined with black near the place, thorax brownish *H. frontalis*.
A dark dash in wing, thorax and abdomen often yellowish.....6.
6. A spot each side on face under antennæ ; abdomen mostly pale..... *H. interpunctata*.
A band on face under antennæ ; abdomen usually darker..... *H. Canadensis*.
7. All costals before bulla broadly margined with black, also some other cross-veins ; small species *H. maculipennis*.
Not so many costals margined.8.
8. Small species, veins hyaline..... *H. simplex*.
Larger species, veins yellowish, costal area yellowish. *H. flavescens*.
Veins brown or marked.....9.
9. Femora unbanded in middle, veins all brownish..... *H. placita*.
Femora banded in middle.....10.
10. Two small dark dots on median carina between antennæ, thorax dark *H. tripunctata*.
No such dots11.
11. Thorax and abdomen very pale ; the longitudinal veins mostly pale *H. pulchella*.
Thorax and abdomen darker, some of the longitudinal veins brown. 12.
12. Apical costal area darker ; larger species, 10 mm. long. *H. luridipennis*.
Apical costal area not much darker ; smaller species, 8 mm. long *H. terminata*.

Heptagenia marginalis, n. sp.

A rather large pale species, but not as pale as *H. flavescens*, the anterior margin of the produced clypeus black : pronotum each side with a black stripe, and the lower margin black ; a black mark on the hind edge of coxa I, one each side of coxa II, one behind the last and rather above it, and one above coxa III at base of abdomen, dorsal segment narrowly margined behind with black, and a dark oblique stripe each side, setæ rather dark ; venter pale, unmarked, except the ventral plate of female is rather darker ; this plate is nearly hemispherical and nearly covering the next segment ; wings faintly darker along the costal area, especially near

the tip; venation brown, none of the veins margined, basal costal cross-vein wholly pale; last dorsal segment of abdomen with two narrow parallel depressions above. Legs pale, femora a little darker at tips, not in middle. In the male the basal joint of tarsus I is shorter than the fifth. Length, 10 mm.

From Glencarlyn, Va., July 23; Harrisburg, Penna., Wetzel's Swamp, Oct. 2, and Great Falls, Va., June 18, ♂.

Heptagenia placita, n. sp.

Male: Head pale, a transverse dark band on vertex; notum rich brown; pleura pale, mostly white; abdomen pale, posterior margin of dorsal segments narrowly black; last two segments reddish-brown; setæ very pale, the joinings barely marked; venter pale; legs pale, femora without median mark, but distinctly darker at tips, tip of tibia I black. Wings hyaline, with brown venation, apical marginal area suffused with brown, basal costal cross-veins black, and costal area before it rather darkened, no other veins margined, six cross-veins before bulla, twelve beyond it. First tarsal joint of leg I one-half as long as second joint, and a trifle longer than the fifth joint. Length, 8.5 mm.; wing, 9.5 mm.

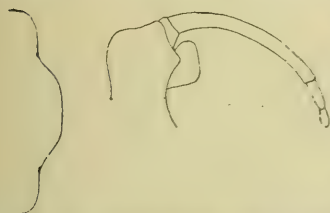


FIG. 13.—*Heptagenia placita*, male forceps and last dorsal segment.

From Sport Island, Sacandaga River, N. Y., June 12. (Alexander.)

Heptagenia tripunctata, n. sp.

Male: Thorax as dark as in *H. terminata*, femora with middle and apical dark bands, tip of tibia I dark; basal joint of tarsus I one-half as long as second joint, subequal to fifth joint; a few brown dots on face, especially two near middle below the anterior ocellus. Each segment of the abdomen with three dark dots on its hind border, one at middle, and one on each lower side, near the stigma; venter unmarked. Wings with dark on the apical costal part; basal cross-vein very heavy and black, other costals also dark; anterior pleura with an oblique dark streak; eight to ten costals before bulla, about fifteen beyond. Length, 10 mm.

From Milwaukee, Wisconsin, also Westfield, N. Y.

Heptagenia frontalis, n. sp.

Male: Pale yellowish, resembling *H. pulchella* and *H. terminata*. There is on the face a black spot under each antennæ and adjoining the

eye ; a narrow oblique black line under front wing, a line over base of hind legs, and margin of pronotum black ; notum brown, but the median prolongation is yellowish. Femora pale, each with middle and apical bands of brown. Wings hyaline, apical marginal area brownish, some cross-veins in costal and radial areas margined with black, one or two under bulla are more broadly margined. The wings are rather long and narrow ; about six costals before bulla and thirteen or fourteen beyond. Length, 8 mm.

From Middlesex Fells, Mass., August ; by the black spots under antennæ it is near to *H. interpunctata*, but separated by absence of the dash in front wings.

H. pulchella and *H. terminata* Walsh.

I think both of these are good species ; in life *H. pulchella* is very pale, almost whitish-hyaline ; while *H. terminata* has a dark thorax, a darker tip to the abdomen, and the stigmal dots are distinct, as well as other marks on the segments, at least in fully-coloured specimens. It is very close to *H. luridipennis*, but smaller.

H. interpunctata Say, and *H. Canadensis* Walk.

Both of these have the black dash under the bulla, but the former is pale, yellow or greenish, while *H. Canadensis* is very dark and larger, and more northern in distribution.

H. flaveola Pict., is, I think, a synonym of *H. interpunctata*. This species is very abundant over the Eastern States ; the female has a prominent black dot above each lateral ocellus, but not the spots under the antennæ.

H. maculipennis Walsh.

This is readily known by the heavily-marked costal cross-veins ; it is a small species, with rather narrow wings ; each abdominal segment has on the sides an oblique dark stripe (not an apical band).

H. simplex Walsh.

A small form which may be this species occurs near Washington, but is rather too small. The wing is narrow, like *H. maculipennis*, but wholly unmarked, and the venation pale.

H. flavescens Walsh.

This is a wholly pale species, of fairly large size. I have it from St. Anthony's Park, Minn.

H. vicarius Walk.

Is a large dark species, with deeply-marked venation, and the tips of hind wings in both sexes and in the subimago rather broadly infuscated.

H. verticis Say.

Is a large, rather dark species, with a dark median stripe on the notum; sometimes there is a faint dash under the bulla, as in *H. Canadensis*.

Heptagenia luridipennis Burm.

Male: brownish; notum rich brown; dorsum of abdomen brownish; two approximate submedian streaks, a lateral streak, and hind margin of each segment darker; setæ pale, alternate joinings plainly brown; legs faintly brownish, all femora with dark middle band, and dark at tips, tip of tibia I black; venter pale brownish, lighter at tip; wings hyaline, faintly darker in the apical marginal area, venation uniformly pale brown, the basal costal cross-vein heavily black, about seven cross-veins before bulla, about twelve beyond, all simple; basal joint of tarsus I hardly one-half as long as second, subequal to fifth. Male genitalia similar to *H. placita*, but the ventral plate is not so deeply emarginate in middle, and the forceps limb is rather longer. Length, 11 mm.; wing, 13 mm.

From Johnstown, N. Y., June 1. (Alexander.) Also Westfield, N. Y., and Washington, D. C.

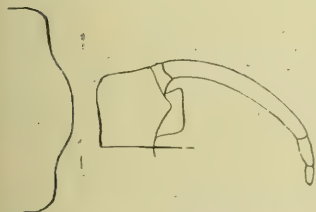


FIG. 14.—*Heptagenia luridipennis*, male forceps and last dorsal segment.

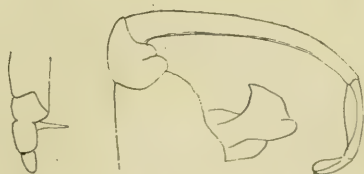


FIG. 15.—*Epeorus pleuralis*, male forceps and middle appendages from side.

Heptagenia (*Epeorus*) *pleuralis*, n. sp.

Pale reddish-brown above, paler beneath; each side from base of fore wing forward is a furcate white streak, other smaller white streaks and spots on the pleura; legs pale brownish, a prominent black spot on under side of each femur, a little before the middle; setæ long, brown, joinings

not marked; wings hyaline, rather darker in costal area near the tip; venation pale brown, the costal cross-veins very faint in basal part of wing. Leg I of male very long, the basal tarsal joint as long as the second, the third about as long, and the fourth plainly shorter. About six or eight costal cross-veins before bulla, and twelve to fifteen beyond. The male forceps very long and slender, the submedian appendages, seen from side, show a submedian erect, slender tooth or spine. Length, 9 mm.; wing, 9 mm.

From near Gloversville, N. Y., May 15. (Alexander.)

Heptagenia (Epeorus) modestus, n. sp.

Pale; thorax and tip of the abdomen dark; other segments of the abdomen narrowly tipped with dark; legs pale, femora banded near the middle with brown, tip of tibia I of male black; basal joint of male tarsus I about as long as the second joint, the third as long as second, the fourth much shorter, fifth one-half of the basal; the first, second and third together a little longer than the tibia; setæ pale, their alternate joints tipped with dark; wings scarcely darker in the apical costal area, longitudinal veins faintly brown, the cross-veins darker brown, none marked with black, except the basal costal; five or six costals before bulla, eight or ten beyond. Length, 6.5 mm.

From Washington, D. C., and High Island, Md., Sept. Readily separated from other species by the pale setæ marked with dark at tips of joints.

Heptagenia (Epeorus) Californicus, n. sp.

Thorax pale brownish; abdomen pale, hind margin of each segment dark; tip of abdomen darker than elsewhere; setæ brown, unmarked; wings with the costal margin rather dark, especially toward tip; venation pale brown, no heavily-marked veins; femora unmarked, but rather brownish, tip of tibia I of male dark; basal joint of tarsus I fully as long as the second, third also as long, fourth a little shorter; first and second tarsal joints together nearly as long as the tibia.

The submedian appendages, seen from the side, do not show any spine above; the last segment of the male forceps is very long. Length, 10 mm.

From the mountains near Claremont, Calif. (Baker.)



FIG. 16.—*Epeorus Californicus*, male forceps.

NOTES ON A FEW BUTTERFLIES FOUND AT KASLO AND
IN NORTHERN BRITISH COLUMBIA.

BY J. W. COCKLE, KASLO, B. C.

It has been suggested that notes on the occurrence of unusual butterflies should be published, and, as the following will show, I have been fortunate in making several interesting captures.

Chionobas gigas Butler.—A remarkable male specimen was taken at Kaslo in thick timber and near the water's edge, at an altitude of 1,800 feet, on the first of June, 1908. All previous records of this species were from the coast mountains at high altitudes. Mt. Arrowsmith, on Vancouver Island, and Mt. Cheam, on the lower mainland, were the only known localities. Wright, in his "Butterflies of the West Coast," says *gigas* is found on the bald knobs of the mountain tops, but never in the valleys or lowlands; so the occurrence of *gigas* in the valley of the Kootenays at a low altitude adds interest to the record.

The specimen on the upper side agrees with specimens from Mt. Arrowsmith, but on the under side there is a marked variation, the primaries being identical with the figure of *ivallda*, Mead., which Wright figures and reports as occurring in the Sierras at an elevation of 10,000 ft. This variation applies only to the maculation; the ground colour is like *gigas*, a rich nut-brown, and not pale straw-colour as in *ivallda*.

Everes comyntas Godart.—One male, Kaslo, B. C., May 30, 1904. Considerable doubt may be expressed as to this record, but the specimen is identical with eastern material, and has no resemblance to *amytula*, which is a common species here. I cannot claim this as a record of farthest west, as I was shown a specimen which I identified as *comyntas*, in the collection of Mr. A. H. Bush, of Vancouver; this was taken on the Stickeen River, on the north coast of British Columbia.

Colias Kootenai.—A probable new species, May 17 to 20, and fall brood to Oct. 9. This has been confounded with *eriphyle*, Edw., but does not agree with Edwards's description. It emerges about three weeks earlier than *eriphyle* in both broods; the margins are narrower, the expanse less than that of *eriphyle*, and the colour of the secondaries on the underside is greenish and not deep orange-yellow, as stated in Edwards's description of *eriphyle*. Unfortunately the *Colias* group is in great need of revision by some one who is broad-minded enough to assign all the various named species to their proper place. I have secured a large series of *Colias* in order to compare them with this reputed new

species, and I find that *philodice*, *eriphyle* and *christina* are generally distinguished in collections as representatives of certain localities, and at the same time I can take individual specimens from all of these localities, and they are absolutely identical in maculation and colour. I do not wish to be understood as saying that the original descriptions of these species are not valid, but that they are so little known that many examples which are now so named in collections are entirely wrong. My own opinion is that *philodice* is far more widely distributed in the west than is generally recognized.

Thecla iroides, Boisd., var. *immaculata*, n. var., one, Kaslo, B. C., May, 1897. An albinic form of *iroides*, of a deep straw colour, shading to canary-yellow, immaculate on both upper and under sides.

This is the only albinic specimen of *Thecla* that appears to be known, and my object in recording it is that possibly some collectors may have met with other specimens of this character; it is the only one I have ever seen, and was taken amongst a large series of *iroides*, which is one of the commonest butterflies here, flying in thousands in the early spring.

Cyaniris ludon, Cram., var. *Quesnellii*, at Bala Lake, Quesnelle, northern B. C. These two specimens were brought down by a "timber cruiser" and given to me. I submitted them to the late Dr. Fletcher, who wrote me that, had they been taken in Ontario, he would have had no hesitation in stating that they were a melanized form of *ladon*, and would have named them "*maculata-suffusa*." As we have already ten recognized varieties of *ladon*, it would seem unfair to burden the lists with a new variety, but in view of the opening up of northern B. C. by the transcontinental railways, there is every reason to think that if this variety is found to be (as I think) a distinct local race, it should be entitled to a specific name. The upper surface is deep violet-blue; the underside has the markings as in *Marginata*, but they are very heavy and of a deep chocolate-brown; a few very minor differences may also be found, but they are trivial.

I hope some of our collectors will obtain further specimens of this "Blue," and can only apologize for naming it tentatively, as I think it will prove a local race which will be found abundant in the Quesnelle Valley. When further specimens can be secured to substantiate the MS. description, I shall take pleasure in publishing a full description as a tribute to a Canadian who was good enough to remember a poor butterfly hunter over 1,000 miles away.

FOUR NEW SPECIES OF HYMENOPTERA.

CHALCIDOIDEA, ENCARTIDÆ.

BY A. B. GAHAN, MARYLAND EXPERIMENT STATION.

The following new species of Hymenoptera are deemed of sufficient interest to warrant description. The two species of *Eupelmus* were reared by the writer during the past season, while the other two species were found accessioned but unidentified in the collection of the Experiment Station. Types of all the species have been placed in the United States National Museum.

Eupelmus brevicauda, n. sp.

Female : Head transverse, as wide as the thorax, somewhat coarsely and densely punctate with silvery-white pubescence on the cheeks and face below antennæ; brassy-green, except the eyes, which are without pubescence. Antennal scape not especially long, flattened on side next to eyes, cupreus-green; flagellum subclavate, obliquely truncate at the tip, pilose; pedicel and two or three following joints brassy; remaining joints darker, nearly black. Prothorax short, narrowed in front, cupreus; mesoscutum with broad longitudinal depression in the middle, green with bright cupreus reflections and with sparse white pubescence, very finely punctate; sternum and pleuræ shagreened, dark metallic-green, former with sparse white pubescence, the latter bare: axillæ slightly separated, scutellum rounded behind and unicolorous with the mesoscutum. Wings very slightly and uniformly fuliginous. Fore and hind coxæ metallic-green, median pair darker; trochanters yellowish; fore and middle femora and tibiæ brownish-yellow, hind femora dark brown, the hind tibiæ with basal half brown and apical half light yellow; all tarsi with 1st joint whitish, following joints brown, last joint and unguis black. Abdomen hairy, with dorsal segments 1-4 deeply incised, dark purplish, except at base, which is bright metallic-green. Ovipositor sheath short, black, except apex, which is yellowish; ovipositor slightly exerted and yellowish. Length, 3.5 mm.

Described from five female specimens reared from eggs of Mantis sp. at College Park, Md., and two female from Galveston, Texas, also reared from Mantis eggs. The Texas specimens were loaned by the United States National Museum.

Eupelmus mompha, n.sp.

Female : Head slightly wider than the thorax, rugosely sculptured, tending to parallel wrinkles on the vertex, temples, and cheeks, brassy-green with more or less purple about the bases of the antennæ; antennæ

12 jointed; scape not reaching the anterior ocellus, colour of burnished brass; pedicel and flagellum dull bronze, almost black, club slightly flattened and obliquely cut off at apex. Prothorax narrowed in front, punctate, with a fringe of long black hairs dorso-posteriorly, slightly æneous; mesoscutum æneous, sculptured and with sparse white pubescence, parapsidal furrows broad and meeting slightly behind the middle of the mesoscutum; axillæ separated, scutellum rounded behind, sculpture and colour like that of mesoscutum; mesopleuræ and mesosternum finely reticulately sculptured, steel-blue, tinged with æneous, the mesepimeron without pubescence; metathorax dorsally nearly smooth, shining green with white hairs laterally. Fore and hind coxæ metallic and punctate, their femora dark blue or black; all the trochanters, knees, and apices of tibiæ yellow; middle femora and all tibiæ yellowish-brown; posterior and middle tarsi with the first two or three joints whitish, the others brown; front tarsi yellowish, the apex brown. Wings hyaline the veins brown. Abdomen as long as the thorax, shining purplish above, more or less æneous below, dorsal segments deeply incised; ovipositor sheath extending beyond the anus, about one-third the length of the abdomen, black at base and apex, with a broad orange-yellow annulus between. Length, 3.8 mm.

Habitat.—Alabama.

Described from four females reared from seed pods of *Cenothera*, which were infested with *Mompha brevivitella*.

Homalotylus albitarsus, n. sp.

Female: Length, 1.5 mm. Head longer than wide, granularly punctate with numerous coarser punctures on the face; eyes large, elongate oval; lateral ocelli touching the eye margins; scrobes not developed; scape long and cylindrical; pedicel nearly three times as long as thick, twice as long as first funicle joint; funicle joints subequal and about as long as thick; club not quite as long as three preceding funicle joints, obliquely acuminate. Prothorax and mesoscutum scarcely punctate, the latter shining and with numerous whitish hairs; mesoscutellum and axillæ very finely and closely punctate and opaque, the former large, with a few scattered hairs; metanotum smooth and shining. Legs long; the middle tibial spur longer than the first tarsal joint. Fore wings with the marginal vein short; stigmal and postmarginal long and equal; a hairless streak running from the base of stigmal vein obliquely backward and inward.

Abdomen not more than half as long as the thorax, the basal dorsal segment reticulately sculptured. Colour: head ferruginous; scape, pedicel, and joints 1, 2 and 3 of funicle dark brown; joint 4 of funicle brown basally, becoming white apically; joints 5 and 6 and the club, white. Prothorax, axillæ, mesoscutellum and mesopleuræ ferruginous; mesoscutum dark brown, nearly black; fore and middle legs dark ferruginous; the posterior femora and tibiæ dark brown; middle and hind tarsi white except apical joint; front tarsi ferruginous; fore wing with a broad band in middle covering a little less than half the wing and a small band at the basal angle fuscous; hyaline between bands and at apex. Abdomen blackish brown.

Habitat.—Washington County, Maryland.

Described from two specimens in the collection of the Maryland Experiment Station. The accession states that these two specimens were reared August 2nd, 1898, from a larva on a peach twig infested with *Lecanium nigro-fasciatum*. The usual hosts of species of *Homalotylus* are *Coccinellidæ*, and it is safe to assume that the host in this case was the larve of some lady-bird which was feeding on the *Lecanium*.

Cheiloneurus lineascapus, n. sp.

Female: Length, 1.6 mm. Head with the vertex, front and borders of the mouth finely punctate and opaque, the cheeks, temples, and space within the semicircular scrobes shining and smooth; ocelli in an acute angled triangle, the lateral ocelli very close to the eye margins; scape reaching a little more than half way to the anterior ocellus, not strongly dilated; pedicel twice as long as thick and equal to the 1st funicle joint; funicle joints compressed and widening gradually to the club, which is about as long as the two preceding funicle joints and about as wide as the last funicle joint. Prothorax and mesopleuræ slightly shining and very finely wrinkled; mesoscutum indistinctly punctate, shining and thinly covered with fine white hairs; mesoscutellum and axillæ finely and closely punctate, the latter with a tuft of very coarse bristles at the apex; metascutum smooth and shining. Middle tibial spur stout and as long as the first tarsal joint, the latter as long as all the succeeding joints combined. Abdomen smooth and shining, as long as the thorax; sheath of ovipositor projecting beyond the anus, about one-fourth the length of the abdomen. Colour: Head yellowish-ferruginous, metallic-green on the cheeks; scape brown, with a white median stripe from the base to the apex; pedicel and flagellum dark brown. Thorax yellow ferruginous, except the mesonotum,

which is purplish-black and the scutellum and axillæ, which are brownish. The anterior wings are wholly clouded, except the basal one-third and a patch at the extreme apex, which are hyaline; legs brown, with the exception of the hind coxæ, which are lighter and the posterior and middle tarsi are light yellow, with the apices brown. Abdomen dark brown above and below, the basal segment above violaceous; the ovipositor sheaths yellow.

Habitat.—College Park, Md.

Described from four specimens reared May 7th, 1898, by Franklin Sherman, Jr. The accession record states that they were reared from *Kermes* on lilac.

NEW SPECIES AND VARIETIES OF NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BARNES, S. B., M. D., AND J. B. MCDUNNOUGH, PH. D.,
DECATUR, ILL.

Apantesis toæle, n. sp.

♂.—Palpi, antennæ, front, thorax and patagia black, the latter edged broadly with whitish-pink on both margins. Collar with a dorsal and two lateral pinkish stripes, the latter being continuous with the edging of the patagia. Pectus blackish, with a pinkish lateral stripe close to base of wings, legs black, marked with light ochre. Abdomen crimson above, with a dorsal and lateral series of broad black spots almost forming a band. Underneath whitish, with two lateral series of black markings, partly confluent. Primaries rich deep brown; costa and inner margin edged with creamy-pink for half their length from base. A broad longitudinal band of same colour in submedian fold, slightly forked near anal angle. The usual subbasal and antemedian bands are absent, the latter being represented by a slight enlargement of the submedian band and a small spot on costa. The medial and postmedial bands are present, but do not reach costa nor extend below the longitudinal band. The W mark is broad, and touches the postmedial band towards its centre, but does not attain to outer margin. The portion of wing enclosed by the cream-coloured bands shaded with black. Secondaries crimson, with broad black irregular band extending along costa and outer margin to anal angle. Inner margin with black dash extending from base almost to outer border. Fringes of both wings deep brown, with a few whitish shades at anal angle of secondaries.

June, 1910

Underneath as above; ground colour considerably lighter and bands of primaries not so distinct.

Expanse, 37 mm.

(a). *Apantesis toæle*, ab. *ophir*, n. ab.

Similar to *A. toæle*, but thorax and collar deep black without stripes.

This species most nearly approaches *A. Williamsi*, from which it may be distinguished by its larger size and more brilliant colouring of secondaries. The fact that a form with black thorax exists would seem to indicate that it is more than a geographical race of *Williamsi*, and for the present we consider it as a separate species. As in all members of this group considerable variation is present. On the primaries the medial band may be reduced to a mere spot, the costal border wanting, and the W mark may meet the postmedial band on costal margin. The broad black margin of secondaries may also be considerably reduced, leaving the irregular indentations to form a submarginal row of three or four spots. In fact, this form, although not so common among the material before us, is probably the original one, and the irregular broad band is merely formed by the fusion of the submarginal spots among themselves and with a narrow costal border. On those specimens with reduced border the basal dash is also missing.

Habitat.—Provo, Ut.; Eureka, Ut. (Spalding.) Described from 6 ♂'s (*toæle*) and 5 ♂'s (ab. *ophir*).

Types.—Coll. Barnes.

Euchatias gigantea, n. sp.

♀.—Palpi, front, antennæ, thorax, legs and wings brownish-gray, primaries slightly sprinkled with lighter scales on outer fourth, well defined inwardly, giving the appearance of a curved line across wing. Anterior edge of collar edged with scarlet, extending downward to form a patch behind the eyes. This scarlet edging is followed posteriorly by a delicate ochreous line, which, broadening out laterally, extends on the under side as far as the point of insertion of secondaries. Fore coxæ, base of wings underneath and abdomen above scarlet, the latter with a series of black dorsal spots and faint traces of lateral markings. Pectus and abdomen underneath light gray, much lighter than wings. Anal tuft yellowish-buff, slightly tinged beneath with orange anteriorly.

Near base of primaries on under side is a small patch of whitish hairs. Expanse, 47 mm.

Habitat.—So. Arizona. (Poling.) Described from 1 ♀.

Type.—Coll. Barnes.

This species can easily be separated from *E. egle*, its nearest relative, by its large size and scarlet abdomen.

Euchætiæ castalla, n. sp.

♂.—Palpi porrect, projecting slightly beyond front, grayish-brown, darker towards tip, with a few reddish hairs at base. Antennæ bipectinate, shaft white on upper side, pectinations and under side of shaft blackish. Collar edged anteriorly with red, which extends downward, forming a small patch behind the eyes. Front, thorax, patagia and wings pure white; on primaries at apex of cell a very slight gray spot. Abdomen red, with a dorsal and two lateral rows of black spots, fading towards posterior end.

Underneath, wings as above, with traces of gray along costal margin and in cell. Pectus and abdomen white, with reddish traces at base of wings and on fore coxæ. Legs grayish-white.

Expanse, 31 mm.

♀.—Very similar to ♂; black markings of abdomen much more prominent; anal tuft white.

Expanse, 40 mm.

This species bears a superficial resemblance to *Pygarcia roseicapitis* N. & D., but lacks the spur of fore tibia, characteristic of the genus *Pygarcia*. It may further be distinguished from the above species by the white shaft of the antennæ, the lack of the characteristic red collar, and the white anal tuft of the ♀, the abdomen of which corresponds very closely with that of *E. Bolteri* Stretch.

Several specimens show traces of gray sprinkling on primaries, and one ♂, for which we propose the name ab. *griseopunctata*, possesses, in addition to this sprinkling of gray scales, a distinct irregular gray band beyond the cell, bent outward from costal margin to vein M_1 and thence, nearly parallel to outer margin, to a point about midway between anal angle and base.

Habitat.—Santa Catalina Mts., Babaquivara Mts., Ariz.; So. Arizona. (Poling.) Redington, Ariz. Described from 14 ♂'s and 3 ♀'s.

Types in coll. Barnes.

Halesidota indistincta, n. sp.

♂.—General colour dark ochreous; palpi, front and shaft of antennæ light yellow; thorax with some indistinct darker shades. Markings on primaries very obscure; three spots along costa of a light yellowish colour,

the first two followed inwardly by a minute spot of similar colour; an obscure spot just beyond cell, from which a faint broken brown line proceeds to middle of inner margin; beyond this another faint line commencing at vein M_2 and ending above inner margin in a reniform spot, slightly lighter than ground colour; a brown dentate submarginal line, most prominent at apex. Secondaries hyaline, tinged with yellow at anal angle.

Beneath hyaline; primaries broadly suffused with dark ochreous at apex and outer margin; costal margin of both wings yellowish, a brown mark just beyond cell, and an incomplete submarginal row of spots of same colour.

Expanse, 43 mm.

Habitat.—Santa Catalina Islands, Calif.

Type.—1 ♂, coll. Barnes.

This species is closest to *maculata*, var. *eureka* Dyar, differing from it, however, sufficiently in the presence of the dentate submarginal line and other points of detail to warrant description.

Litodonta contrasta, n. sp.

♂.—Collar gray, edged with black posteriorly; thorax and patagia brownish-black, intermingled with gray scales. Abdomen gray, beneath whitish; legs hairy, gray; tarsi black. Primaries dark smoky-brown; basal line distinct in costal half, black, edged internally with white. T. a. line obscure, geminate, slightly outcurved to cubital vein, thence following vein backward for a short distance and again curving outward to inner margin; in costal portion filled with whitish and followed by a grayish median shade. At extremity of cell a thin, black, S-shaped mark. T. p. line scarcely visible as a geminate series of lunules, convex inwardly. A small white apical patch tapering off into an obscure series of submarginal yellowish spots. Fringes concolorous with wings, edged with black basal line and with black dashes at extremity of veins. Secondaries white; slight traces of brown shading along outer margin; fringes white.

Underneath primaries smoky, white at base and along inner margin, darkest along costa towards apex, the dark shade containing three small white dashes. Secondaries white, with thin edging of black along costa.

Expanse, 30 mm.

Habitat.—Babaquivera Mts., Ariz.

Type.—1 ♂, coll. Barnes.

Eunotela angustiora, n. sp.

This species corresponds in venation with the genus *Eunotela* (Schaus. Rev. of Am. Notodontidae) with the exception of veins M_3 and Cu being from a point instead of separated. In wing shape it more nearly approaches the genus *Kurtia* (Schaus. Rev. of Not., pl. XII, fig. 7), having the primaries narrow and pointed, with a convex costal margin. It may be necessary to create a new genus for its reception, but for the present we place it in the former genus.

♀.—Palpi porrect, brown, sprinkled with grayish scales. Front and collar yellow-brown, bordered posteriorly by a darker shade. Patagia and thorax gray, with a few darker hairs intermingled. Abdomen gray-brown, underneath much lighter; legs hairy, gray. Primaries gray, sprinkled with darker scales. Basal line indistinct; t. a. line represented by a blackish shade, outwardly angled near costa, and an indistinct geminate black line at inner margin. Beyond the black shade and occupying the position of the reniform is a distinct geminate black lunule, convex outwardly and extending from costa to cubital vein, most apparent in the cell, where it contains a few reddish-brown scales. Reniform oblong, edged with black on inner margin and preceded by whitish shade. T. p. line only represented by some darker dashes on the veins, followed by a distinct reddish-brown slightly-waved shade, extending across wing and angled outwardly at inner margin; on costa this shade is preceded by a few black dashes. A very distinct row of six round black spots occupies the terminal area in the interspaces of the veins R_5 to first anal. Fringes gray, preceded by a faint black line. Secondaries smoky, slightly darker on outer margin. Under side of primaries smoky, darker along costa, with a small black spot near apex; submarginal row of spots showing through from upper side. Secondaries whitish, shaded with darker at apex.

Expanse, 44 mm.

Habitat.—Palmerlee, Ariz., 1 ♀.

Type.—Coll. Barnes.

Heterocampa ditta, n. sp.

♂.—Head and thorax blackish, slightly sprinkled with gray; abdomen brown; first segment lighter, with blackish tuft; last segment concolorous with thorax; underneath silvery-gray. Primaries almost uniform deep black-brown, slightly darker at base, with a sprinkling of grayish scales along middle of costa. At end of cell a narrow curved black mark. From a point on costa close to apex a clearly-defined white streak of even

width proceeds inward to vein M_1 , somewhat interrupted in anterior third by blackish scales. Secondaries white, with a very narrow marginal border of black, extending to anal angle. Fringes checkered. Underneath primaries whitish, strongly suffused with black along costa and at apex. Secondaries white, with traces of darker markings along costa.

This species most nearly approaches the *subrotata* group, but appears sufficiently distinct from all specimens examined by us to warrant a new name.

Expanse, 33 mm.

Habitat.—Santa Catalina Mts., Ariz., 1 ♂.

Type.—Coll. Barnes.

Heterocampa pulverea, var. *averna*, n. var.

Similar in size and markings to *pulverea*, G. & R., but entirely lacking the olive-green tinge peculiar to the eastern specimens of this species; ground colour blackish-brown shaded with lighter; black submarginal shades very distinct, white patch beyond cell not so prominent, shaded with brown. Secondaries white, with a well-defined marginal border of blackish and markings on costa, as in typical species. The smoky appearance of *pulverea* entirely lacking.

Habitat.—Redington, Ariz.

Type.—1 ♀, coll. Barnes.

This is probably the western race of this species, and in general appearance is much darker than the form of the Eastern and Middle States.

(To be continued.)

A NEW STAMNODES.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

In the CAN. ENT. for October, 1909, page 366, I gave a brief review of the genus and species of *Stamnodes* Guen., and among the latter I included, by error, *Alaskæ* Hulst. How my notes were made to mislead me I cannot explain now, but the species does not belong there, and must be stricken from the list. In this connection I will add, however, this description of a new species, which rightly finds its place with the group as I separate them:

Stamnodes Reckseckeri, n. sp.—Expanse, 32 mm. Palpi short, dark gray beneath, dull white above. Front white and silken-gray mixed. Thorax soiled-white, with narrow central black line; patagiæ silken gray;

June, 1910

abdomen above soiled-white and gray, darker at tip. All wings above a silky even fuscous-gray, with a faintly roseate flush, the primaries near base, narrowly beneath costa, and apically, sprinkled with black atoms. These form on costa near base a square patch, within which is a smaller white patch, neither very definite in outline. Costa white scaled, changing to buff toward apex. No markings above. Fringes pink, cut with a fine pencil of black hairs opposite veins. No discal dots.

Beneath, the ground colour as above. Along costa, very narrow at base, and widening as it approaches apex, running down very narrowly along outer margin a band of rosy, white and black scales extends. The narrow white extradiscal line, about one-fifth from apex, crosses costa in a straight line to vein seven, then becoming fainter, as it curves a little outward, is lost centrally. A narrow bright chestnut band borders this line outside from costal edge to vein seven, ending in black at vein six. Discal spots indicated faintly as a dusky bar, nearer base than usual. Fringes pink, darkened by black atoms. Secondaries, from base to extradiscal line, are covered with pinkish, white and black scales, the latter massed into an irregular blotch, which nearly fills the outer half of cell, darkest costally, and beneath washed with chestnut. The extradiscal, a narrow white line is more evident near inner margin and at costa, where, starting two-thirds out, it runs outward toward centre of outer margin to vein five, then with a rounded angle backward to vein two, thence in a straight line across to inner margin, a little within anal angle. A shading of black atoms running outward on veins borders this line externally from costa to vein six, where it is heaviest, fades out and reappears at vein three, broadening a little as it runs to inner margin. A cluster of black scales at middle of inner margin, and another at inner border of extradiscal line. Subterminal space and fringes evenly dusted with white, black and chestnut-red scales, the latter predominating, giving it a ruddy appearance. Body, legs and abdomen beneath covered with similar scales, the latter somewhat darkened.

Type.—One ♂ from San Diego, Calif., III, 20, 1910, which I owe to the kindness of Mr. L. E. Recksecker, whose name I have given it. There is a ♂ in rather poor condition in the Museum of the Brooklyn Institute, from Monterey Co., Calif., which I have made a co-type.

This species is near to *delicatum* Gross., but is larger, and beneath presents quite a different pattern, lacking also the reddish hue of that species.

NOTES ON TENTHREDINOIDEA, WITH DESCRIPTIONS OF
NEW SPECIES.

BY S. A. ROHWER, WASHINGTON, D. C.

PAPER XI.—(GENERA OF PAMPHILIINÆ AND NEW SPECIES).

PAMPHILIINÆ (olim *Lydinæ*).

Linnæus in 1758 divided the genus *Tenthredo* into six divisions; all except the last, which was composed of species known in immature stages only, are now recognized as families or subfamilies. The fifth of these Linnæan divisions of *Tenthredo* contained species now placed in the subfamily Pamphiliinæ. Latreille (Hist. nat. Crust. et Insect, III, p. 303, 1802) was the first to give this division of *Tenthredo* a name, when he founded his genus *Pamphilius* on *Tenthredo sylvatica* Linnæus—the genus being monobasic.*

Fabricius (Syst. Piez., p. 43, No. 5, 1804), apparently overlooking Latreille's name of 1802, founded his genus *Lyda* on sixteen species, which have been placed in various segregates of Pamphiliinæ. Curtis (British Entomology, 1831) fixed the type of the genus *Lyda* as *Tenthredo sylvatica* Linnæus, a species originally included, making the genus a synonym of the older name *Pamphilius*—the two genera having the same types.

Panzer (Fauna Ins. Germ., Vol. VIII, p. 86, 1805) proposed another name, *Cephaleia*, for the same group, but the name has been restricted to include only those species closely allied to *Tenthredo signata* Fabricius, so the name still holds good.

A. Costa (Pros. Hym. Ital., III, p. 232, 1894) was the next to propose names for the various groups of species, when he divided *Lyda* into *Acantholyda* and *Anoplolyda* on the presence or absence of a super-apical spur on the anterior tibiæ.

Rev. F. Konow in 1897 (Ann. K. K. Nathist., Hofmus, XII, pp. 1–32) considered these insects as a tribe, Lydides, and recognized five genera and four additional subgenera. Since then his arrangement has been followed, and with the exception of *Liolyda* Ashmead (CAN. ENT., p. 209, 1898), no new segregates have been proposed.

*Monobasic is a term used to indicate that a genus was founded on one species. In a certain sense it is synonymous with the current use of monotypic, but monotypic had best be used in a restricted sense for those genera which are strictly monotypic, *i.e.*, containing only one species. Monotypic is an unfortunate name, for all genera are necessarily monotypic, as they can have only one type.

GENERIC NAMES USED IN PAMPHILIINÆ.

Acantholyda A. Costa, Pros. Hym. Ital., III, p. 232, 1894.

Type: *Tenthredo erythrocephala* *Linnaeus* [first species].

Anoplolyda A. Costa, Pros. Hym. Ital., III, p. 233, 1894.

Type: *Lyda alternans* A. Costa [first species].

Bactroceros Konow, Ann. K. K. Nathist. Hofmus., XII, p. 21, 1897.

Type: *Tenthredo vafer* *Linnaeus* [chosen].

Cænolyda Konow, Ann. K. K. Nathist. Hofmus., XII, p. 15, 1897.

Type: *Tenthredo reticulata* *Linnaeus* [chosen].

Cephaleia Panzer, Fauna Ins. Germ., VIII, p. 36, 1805.

Type: *Cephaleia arvensis* *Panzer* = (*Tenthredo signata* *Fabricius*).

Gongylocorsia Konow, Ann. K. K. Nathist. Hofmus., XII, p. 19, 1897.

Type: *Lyda mandibularis* *Zaddach* [monobasic].

Itycorsia Konow, Ann. K. K. Nathist. Hofmus., XII, p. 13, 1897.

Type: *Tenthredo hieroglyphica* *Christ* [chosen].

Kelidoptera Konow, Ann. K. K. Nathist. Hofmus., XII, p. 20, 1897.

Type: *Lyda maculipennis* *Stein* [monobasic].

Lyda *Fabricius*, Syst. Piez., p. 43, No. 5, 1804.

Type: *Tenthredo sylvatica* *Linnaeus* [Curtis, 1831].

Liolyda Ashmead, CAN. ENT., p. 209, 1898.

Type: *Lyda frontalis* *Westwood* [designated].

Neurotoma Konow, Ann. K. K. Nathist. Hofmus., XII, p. 18, 1897.

Type: *Tenthredo flaviventris* *Linnaeus* [chosen].

Pamphilius Latreille, Hist. Nat. Crust. and Insects, III, p. 303, 1802.

Type: *Tenthredo sylvatica* *Linnaeus* [monobasic].

GENERIC SYNOPSIS OF PAMPHILIINÆ.

Claws with an inner tooth 1.

Claws cleft 2.

1. Anterior tibiæ with a superapical lateral spur . . . *Acantholyda* A. Costa.

— Anterior tibiæ without a superapical lateral spur . . . *Cephaleia* *Panzer*.

2. Intercostal vein with only the lower branch present . . *Neurotoma* *Konow*.

— Intercostal vein with both branches present,
forked *Pamphilius* *Latreille*.

Acantholyda A. Costa.

Postgenal area carinated *Itycorsia* *Konow*.

Postgenal area not carinated . . . *Acantholyda* A. Costa = (*Lyda* *Konow*).

Cephaleia Panzer.

Basal nervure joining the costa either free or at the base of the cubitus,
never on the cubitus *Cænolyda* Konow.

Basal nervure joining the cubitus free from the
costa *Cephaleia* Panzer = (*Liolyda* Ashmead.

Neurotoma Konow.

Postgenal area carinated *Neurotoma* Konow.

Postgenal area not carinated..... *Gongylocorsia* Konow.

Pamphilius Latreille.

Basal nervure joining the costa free from or at the base of the cubitus, never
joining the cubitus free from the costa..... *Kelidoptera* Konow.

Bazal nervure joining the cubitus free from the costa 1.

1. First flagellar joint more than half as long again as the
second..... *Anoplolyda* A. Costa = (*Bactroceros* Konow).

— First flagellar joint subequal with or slightly longer than the
second *Pamphilius* Latreille.

Acantholyda Kincaidi Rohwer.—*Itycorsia Kincaidi Rohwer*, CAN.
ENT., p. 91, 1910.

The placing of this species in *Itycorsia* was a mistake. It belongs to *Acantholyda*, and is allied to *margiventris* (Cresson), but may be separated from that species by the dark red tibiae and tarsi, and in having a pale spot on the pleura.

Cephaleia Hopkinsi, n. sp.—Superficially resembles *Cephaleia fulviceps* Roh., from New Jersey, but the postocellar area is nearly quadrate, not wider than the cephal-caudad length, and the legs below the coxæ are rufous, not black.

Male: Length, 11.5 mm. Lateral supraclypeal areas shining, impunctate; clypeus and supraclypeal area broadly rounded, not carinate; postocellar furrow wanting; ocellar furrows nearly parallel; antennæ 21-jointed, third joint nearly as long as the three following; middle area of the mesonotum punctured, the sides impunctate; hypopygidium wider than its cephal-caudad length, pointed, apically and triangularly depressed. Black; head, except a large quadrate spot from antennæ to occiput and apical part of mandibles rufous; legs below coxæ the colour of head. Wings dusky hyaline; venation black.

Type locality: Flagstaff, Arizona. One male swept from yellow pine (*Pinus scopulorum*) 28th May, 1904, by Dr. A. D. Hopkins.

Type: Cat. No. 13080, U. S. N. M.

Anoplolyda sæva, n. n.—*Bactroceros pugnax* Roh., Jour. N. Y. Ent. Soc., XVI, No. 2, p. 103, 1908; non *Pamphilina* (*Bactroceros*) *pugnax* Knw., Ann. Nathist. Hofmus. Wien., XII, p. 24, 1897.

Pamphilus ocellatus, n. sp.—♀. Length, 10 mm. Clypeus subtruncate, lateral angles rounded, carina strong but not extending to the apex, the surface, also the front below the crest, with shallow confluent punctures, those of the lateral supraclypeal area more separate; crest strongly broken by the antennal furrows; middle fovea wanting; ocellar basin strongly defined, V-shaped above; head behind the crest shining, nearly impunctate; labrum with a broad tooth in the middle; antennæ about 28-jointed, third joint shorter than the scape; mesonotum and mesopleuræ shining, nearly impunctate; scutellum with rather close punctures; abdomen shining, impunctate; second and third cubital cells subequal in length. Black; apical half of antennæ, clypeus, base of mandibles (apices piceous), most of posterior orbits, area around ocellar basin, postocellar spots, line from occiput to middle of inner orbit, where it enlarges, tegulæ, prosternum, spot behind, legs beyond coxæ, except the posterior tibiæ and tarsi, *pale yellow*; abdomen beyond the first posterior segment reddish; wings yellowish-hyaline, iridescent; venation dark brown.

Type locality: Minnesota. Four females.

Type: Cat. No. 12785, U. S. N. M.

Pamphilus fulvifrons, n. sp.—♀. Length, 10 mm. Except as noted, this species agrees with the above description of *ocellatus*: Sculpture of front finer, carina weaker, middle fovea represented by an elongate open fovea, ocellar basin not so sharply defined, scutellum impunctate, labrum subtruncate, third cubital cell longer than the second, flagellum fulvous, pleural spot and lower prothorax spot wanting, hind tibiæ and tarsi colour of the rest of the legs, and posterior orbits black.

Type locality: Portland, Oregon, June 13; another specimen from Washington State.

Type: Cat. No. 12786, U. S. N. M.

Pamphilius rubi, n. sp.—Differs from *ocellatus* in size, absence of mark on pleuræ, less prominent ocellar basin, etc. This species was labeled *pallimaculata*, but is not that species, although it resembles it in colour.

♀.—Length, 7.75 mm. Clypeus and front sculptured as in *fulvifrons*; middle carina sloping abruptly at base of clypeus; crest not sharply defined, strongly broken by antennal furrows; ocellar basin as in *fulvifrons*; vertex and orbits subopaque, with a few scattered punctures; postocellar area parted by a faint furrow; third antennal joint shorter than scape; labrum gently rounded at the apex, the middle of apex with a small tooth; mesonotum and mesopleuræ shining, with separate punctures; scutellum with closer punctures, appendage dulled with fine incomplete striæ; abdomen shining; venation normal. Colour black; apex of the clypeus (deeper in middle), spot on lower posterior orbits, three spots on crest, line from superior orbits to occiput, postocellar lines reduced to spots, apical third of antennæ, tegulæ, scutellum, legs below coxæ, except posterior tibiæ, *pale yellow*; abdomen beyond first segment sanguinous. Wings hyaline, iridescent, slightly dusky; venation dark brown.

Type locality: St. John, N. B., Canada, July 24, 1899 (J. Fletcher). Other specimens from Agricultural College, Michigan. Larva feeds on raspberry (*Rubus*).

Type: Cat. No. 12784, U. S. N. M.

Pamphilius subcavifrons, n. sp.—Separated from its nearest known ally, *cavifrons* (Cresson), by the opaque head, circular middle fovea, broader and larger genitalia, etc.

♂.—Length, 6.75 mm. Anterior margin of the clypeus subtruncate, lateral angles rounded, the surface and area between the antennæ punctato-granular, the lateral supraclypeal areas impunctate; middle fovea small, circular; frontal crest very strong, deeply broken by the antennal furrows, which extend nearly to the occiput; ocellar basin rounded below, sharply V-shaped above; postocellar furrow distinct; venter finely shagreened, occiput and posterior orbits shining, with separate punctures; antennæ about 22-jointed, third and fourth joints subequal; mesonotum shining, almost impunctate; scutellum finely punctured, dulled; abdomen impunctate; genitalia very large, broader than long; hypopygidium broadly, deeply impressed; venation normal. Colour black; head below crest, mandibles, palpi, posterior orbits a little above the top of eyes,

posterior part of anterior lobe, tegulae, small spot on pronotum, spot on prosternum, oblique line on mesopleurae, spot above posterior coxae, legs, except bases of coxae, pale yellow; apical margin of abdominal segments beneath whitish-yellow. Wings hyaline, iridescent; venation pale brown. Labrum with a long apical tooth.

Type locality: North America. One male labeled "Taken on leaf of *Amelanchier* saw ovipositing, 5/2, 85."

Type: Cat. No. 12783, U. S. N. M.

Pleroneura brunneicornis Roh.—Corrected spelling for *P. brunneicornis* Roh., CAN. ENT., p. 39, 1910.

Pleroneura Schwarzi n. sp.—Easily known from the other black American species by the dark legs.

♀.—Length to ovipositor, 4.5 mm.; length of ovipositor, 2 mm. Anterior margin of the clypeus triangularly, obtusely produced in the middle; middle fovea present, nearly circular; antennal furrows meeting above the anterior ocellus; postocellar furrow present, but above the postocellar line and shorter than it; postocellar line longer than the ocelloccipital line; antennae with short hairs; head finely granular, opaque; thorax anteriorly more roughly sculptured than the head; stigma triangular below; first recurrent quite free from the first transverse cubitus; sheath sharply pointed, tapering below; tibiae with rather stout spines. Black, anterior tibiae dark brown; abdomen somewhat yellowish; wings subhyaline, vitreous; venation very pale brown.

Type locality: Alta, Utah. One female collected June 30 by Mr. E. A. Schwarz, who says the insect was taken when the snow was still on the ground, and was undoubtedly swept from some coniferous tree.

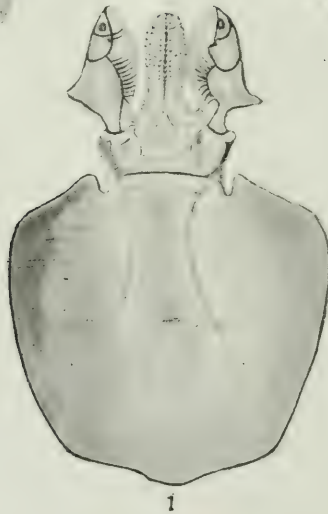
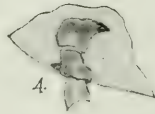
Type: Cat. No. 13081, U. S. N. M.

POSTPONEMENT.

On account of the universally lamented death of His Majesty King Edward the Seventh, the annual meeting of the Royal Society of Canada, which was to have been held from the 17th to the 19th of May, has been postponed, and will not be held till September. The exact date at which it will be held will be announced later.

W. D. LESUEUR, Honorary Secretary, R. S. C.

Mailed June 4th, 1910.



HAEMAPHYSALIS PUNCTATA.

The Canadian Entomologist.

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No. 7.

NOTE ON THE FINDING OF *HÆMAPHYSALIS PUNCTATA* AT WINNIPEG, MANITOBA.

BY SEYMOUR HADWEN,

First Asst. Pathologist, Dominion Department of Agriculture.

In August, 1909, I was given two female ticks (taken from a steer) which had been collected by Dr. Hobbs, of Winnipeg; these ticks proved to be identical with some females sent in a year previously to the Biological Laboratory by Dr. C. D. McGillivray, also from Winnipeg. At that time it was thought that they might prove to be *Boophilus annulatus*. After examining the ticks, I had no hesitation in deciding that they belonged to the genus *Hemaphysalis*, that probably the species was new to North America and might prove to be a carrier of Red-water. As far as I am aware only two species of *Hemaphysalis* have been described in North America, i.e.: *Hamaphysalis leporis palustris* and *H. chordeilis*. (Banks, Revision of the Ixodoidea of the U. S., 1908.)

On obtaining permission from the Veterinary Director General, I forwarded drawings, also specimens, together with a description, to Professor Nuttall, of Cambridge, who was kind enough to identify the specimens, and has replied, saying the tick is a female *Hemaphysalis punctata*.

According to Nuttall, *H. punctata* has only been recorded once before in America, by C. L. Koch, at Para, Brazil, in 1847. (?) He described it as *H. cinnabarina*.

I have no need to point out the importance of this finding, and to the possibility of this tick transmitting Red-water (*Piroplasmosis bovis*) to Canadian cattle, as it has been proved to do in England and elsewhere. As the tick is a three-host tick, its eradication will be a most difficult matter.

I append the description I sent to Professor Nuttall, and below it a condensed description taken for comparison from Parasitology, Vol. I, No. 2, June, 1903.

Hemaphysalis.—Description sent to Professor Nuttall: Female gorged; colour greenish-gray in fresh specimen, brown-red in alcohol. Scutum and legs brown; capitulum broader than long; hypostome,

5 rows of teeth on each side; porose areas round, widely-separated fossa between; palpi, second segment has 11 hairs, third segment has 2 stiff bristles at internal angle; scutum as wide as long, deep cervical grooves, coarsely punctate; coxæ 1, 2, 3 and 4, short spines about equal in size; coxa 1 with retrograde spine; stigmatal plate nearly round.

Described from 4 specimens found on cattle at Winnipeg, Man.

Abbreviated description for comparison with attached from Parasitology, Vol. I, No. 2, June, 1908. Article by Nuttall, Cooper and Robinson:

Hæmaphysalis punctata.—Female: Colour reddish-brown (unfed), steel-gray or slate-gray (gorged). Scutum dark reddish-brown; capitulum, length, 770-880; hypostome, 5 files of teeth sharply pointed on each half (they state that a slight variation is found at times); porose areas, large, well separated, rather wider than long; palpi, usually 13 hairs in number, but subject to variation; scutum, length, 1.08-1.37 mm.; breadth, 1.05-1.31; cervical grooves deep anteriorly; punctations irregularly scattered, few in number; coxæ each bear a short wide spur at the posterior margin; spiracle nearly circular.

EXPLANATION OF PLATE 6.—*Hæmaphysalis punctata*.

Fig. 1. Capitulum and scutum of female, ventral view from mounted specimen.

Fig. 2. Capitulum and scutum of female, dorsal view.

Fig. 3. Stigmatal plate.

Fig. 4. Coxa I.

Fig. 5. Tarsus I.

Fig. 6. Tarsus II.

TWO NEW SPECIES OF AFRICAN PARASITIC HYMENOPTERA.

BY J. C. CRAWFORD, WASHINGTON, D. C.

Family SCELIONIDÆ.

Scelio Howardi, n. sp.

Female.—Length about 4.5 mm. Black, the femora dusky-brownish, the tibiæ and tarsi brownish-yellow; head and thorax coarsely rugose, the parapsidal furrows not apparent; basal half of scape ferruginous; propodeum medially, coarsely rugose, laterally the surface covered with white pubescence; the whole insect with scattered, coarse and somewhat flattened, white pubescence, that on the mesonotum slightly yellowish;

July, 1910

propleuræ rugose, mesopleuræ and metapleuræ finely rugoso-punctate ; wings dusky, the marginal vein punctiform and with an infuscated spot ; the stigmal vein distinct, not longer than the infuscated spot at the marginal vein ; segments 1-5 longitudinally striate, the apical margins of the segments smooth ; basal two-thirds of segment 3 irregularly reticulately rugose, the longitudinal striæ the stronger ; segments 4 and 5 with fine transverse striæ between the longitudinal ones ; segment 6 rugose ; segment 2 strongly depressed basally ; venter longitudinally striate.

Male unknown.

Host : The eggs of *Cyrtacanthacris septemfasciata* Serville.

Type locality : Zambesi River, Africa.

Type No. 13143, U. S. N. M.

Described from eight specimens from material collected in December, 1908, by Mr. C. W. Howard, after whom the species is named.

The colour of the legs varies in some specimens, the femora and tibiæ being reddish, without any trace of dusky suffusion.

Family EULOPHIDÆ.

Tetrastichus periplanetæ, n. sp.

Female.—Length about 2 mm. Dark green, the extreme apex of femora, the tibiæ and the tarsi testaceous ; antennæ dark brown, the scape testaceous ; antennæ with one ring joint ; pedicel somewhat more than half the length of the first joint of the funicle ; first joint of funicle slightly longer than the second, this slightly longer than the third ; club of antennæ distinctly three-jointed, almost as long as joints 2 plus 3 of funicle ; head and thorax closely, finely lineolate, the vertex and pronotum with a few scattered punctures ; median groove of mesonotum very distinct ; metanotum and propodeum with very fine shallow thimble-like punctures ; median and lateral carinæ of propodeum very strong, the lateral ones bifurcate posteriorly, the outer branch of the carina running to the hind coxæ ; propodeal spiracles large, oval, the area immediately surrounding them smooth ; prepectus and metapleuræ with thimble-like punctures ; lower two-thirds of mesepisternum reddish and with fine thimble-like punctures ; rest of mesepisternum and mesepimerum almost without sculpture ; wings hyaline, the veins almost colourless ; hind coxæ on outer side rugose. Male unknown.

Host : Eggs of *Periplaneta americana* Linnæus.

Type locality : Lourenco Marquez, Africa.

Type No. 13144, U. S. N. M.

Three specimens reared by C. W. Howard, together with numerous specimens of *Tetrastichus Hagenowii* Ratzeburg.

BUTTERFLY COLLECTING NEAR HOPE, BRITISH COLUMBIA.

BY JOHN RUSSELL, HOPE STATION (C. P. R.), B. C.

Probably nothing more disgusts the ardent entomologist than to "wave" his net in a country where but a small variety of insects can be found, and mostly common things at that.

Through May and June I had collected near New Westminster, and at last, getting tired of that miserable country, with its huge stumps, thick underbrush and lack of butterflies worth catching, decided to take a trip into the mountains, and see what might be found there.

Three places I had in mind, the Pitt Mountains, the Fraser Canyon, and the trail between Hope and Princeton. The last seemed most alluring, and so was chosen.

Hope is a town on the south bank of the Fraser, about eighty miles above New Westminster. Princeton, on the Similkameen River, is in what is called the "Dry Belt." The two places are, by trail, sixty-five miles apart, all the way being through the mountains. There are two high points on the way, the first, which I shall call Hope Summit (or Lake House), is two thousand feet high, and fourteen miles from Hope; the other, Princeton Summit (or Summit City), is about 6,000 feet high, and forty miles from Hope. Between these two heights the trail descends into the valley of the Skaget River.

Arriving at Hope Station on the evening of July 4th, I crossed the river on the ferry boat (the mail-carriers' skiff, two bits per trip), and spent that night, because it was raining, at the hotel. Next day it rained on, but in spite of my own somewhat discouraged feelings (for when rain once commences on the Pacific Coast, one can never tell when it will end, a week, a fortnight, a month perhaps) and the advice of the good people to wait till the downpour stopped, I shouldered my pack at midday and began to walk.

That night was spent under the ten mile shelter, a lean-to of cedar bark, built against the side of a tree. It rained steadily. But by the next evening I had crossed the Hope Summit, and was at the bottom of the Skaget Valley, about twenty-seven miles from Hope. Here it did not rain, was only misty.

During the next day, July 7, I climbed the hardest part of the trail, to the Princeton Summit. The way led out of thick timbers into a country whose mountain sides had once been covered with fir and spruce, but a fire had at some time swept through there, and the bare trunks lay or

stood on every side. A new growth of these soft woods was very slowly taking the place of the dead, and meanwhile a great deal of low alder, willow and maple has grown up.

Mountain flowers in quantities, and generally of very bright colours, were everywhere, and when at about noon the sun shone out, butterflies, especially the blues, swarmed all around. On this up-climb I took my first specimens of *Erebia Vidleri*, and on a sandy flat a few miles below the big summit a Saturniid moth, *Pseudohazis Nuttalli* Strecker, was quite plentiful, as also a large dull green tiger beetle.

From this flat to the summit is the hardest part of the climb, as the trail rises in curves and zigzags innumerable. I soon became very warm indeed, but a tremendous thunder and hail storm soon wet me to the skin. It was unpleasantly cool. I caught no more butterflies after that, but hastened on to the summit shack, where I was able to make a fire and dry off.

The weather was fine there, so I camped for a day or two, and had very good luck among the butterflies. A species of *Melitaa*, which seems to answer only to *Taylori* Edw., as figured in Holland's Book, was plentiful.

From here the trail goes down by the side of Whipaw Creek to Princeton, about twenty-five miles. This took me, collecting many things by the way, a day and a half.

At the Princeton Summit the timber, what there is of it alive, is fir, but after you have descended a few miles, you enter a long stretch of small pines, growing closely together. Gradually this changes, till, in a few miles more, one is in the dry country, where the red-trunked pines stand far apart, and the green grass grows between, all decked with yellow and blue flowers. The trees and grass and flowers and the sky all combined to make very pleasing landscapes.

Collecting was good all the way, a moth, *Syneda hudsonica* G. & R., being common, and easily taken, as it flies in the sunlight.

At Princeton, where I camped by the side of the clear rushing Tulameen, quantities of butterflies and beetles were to be found. Almost every stone or log or piece of bark would have a beetle under it (some of them very large specimens), and the flowers were haunted by members of the same order. The hills rise from the river in a series of steps, or benches, the lowest of which usually has a dense growth of willows, cottonwood, etc.

Collecting at Princeton being so good, I was tempted to tramp down the Similkameen to the Okanagan, but was already so far from home that that idea was given up, to be realized later, I hope. After buying a new supply of rice, bacon, hardtack and coffee, I took the back trail, Princeton to Hope, going slowly and collecting by the wayside. The *Lycænidæ* were plentiful everywhere, and *Erebia Vidleri* was rather common for about ten miles east of the Princeton Summit.

At the Summit two or three days were spent, and as I had no tent I slept in the shack, which had been built by a couple of trappers. It was a small log affair, with a sod roof, and a door large enough to crawl through; in one corner was a suspicious-looking bed, on which I slept not; in the opposite corner was a rough fireplace. It was better than no shelter at all, however, for at such high points the nights are very cold, and even then in July one's dish-cloth would be found frozen stiff in the morning.

A day or so was spent at the sandy flat below the summit, as also at Cayuse Flat, in the bottom of the Skaget Valley, in which latter spot many *Geometridæ* were taken.

My grub was almost gone then, so I made a day's journey to Hope. From there I came down the south bank of the Fraser to Mt. Cheam, which it was my intention to climb, but on account of wet weather I kept on to Chilliwack, from which place the steamer was taken to Westminster.

The following is a list of species taken during the trip, and if exception may be made to any of the kinds named (especially among the *Lycænidæ*), my only excuse is that I was unable to send them to Victoria or Ottawa to be identified, and so had to do it myself, using Holland's Book for that purpose:

Parnassius clodius Manatries.—Quite common in the Fraser Valley.

Papilio zolicaon Boisd.—Cayuse Flat, on the Princeton trail.

Synchlœ sara Boisd.—Princeton trail, on a flat about 38 miles from Hope, July 17.

S. Realsirtii Edw.—At the same spot as *Synchlœ sara*, July 18.

Eurymus interior Scud.—Princeton trail, July 14.

Argynnis aphrodite Fabr.—If *aphrodite* is found in the far west, this must have been it, as it seemed identical with the eastern species, July 11.

Brenthis epithore Boisd.—This butterfly is very common on the coast, and even on the higher summits was abundant.

Lemonias Taylora Edw.—A strong, swift flier, but as it lit often on the ground and on flowers, it was easily taken. Very common at the Princeton Summit, appearing whenever the sun shone out.

L. Whitneyi Behr.—Princeton, July 12.

L. Hoffmani Behr.—Princeton, July 12.

Phyciodes pratensis Behr.—Very common everywhere along the trail.

Basilarchia Lorquini Boisd.—Very common everywhere.

Cercyonis charon Edw.—Quite common at Princeton.

Erebia Vidleri Elwes.—On each side of the Princeton Summit, but especially abundant towards Princeton, for about ten miles, wherever were any kind of open grassy spots. It is a weak flier, and often settles on the grass or leaves, and so is easily captured.

Coenonympha elko Edw.—Princeton, but not common, July 12, 13, 14.

Cœneis gigas Butl.—Skaget Valley, two specimens, July 20. I am not sure of this species, but my specimens only answered to that species as figured in Holland's Book.

Epidemia mariposa Reak.—Skaget Valley, July 20.

E. helloides Boisd.—Common everywhere.

Cupido lycea Edw.—High summit to Princeton.

C. fulla Edw.—Princeton to Cedar Flat. Very common.

C. sæpiolus Boisd.—Skaget Valley, Princeton.

Nomiades antiacis Boisd.—Skaget Valley, Princeton Summit.

Phædrotes sagittigera Feld.—Princeton, July 12. Two specimens.

Agriades podarce Feld.—Skaget Valley, Princeton Summit.

A. rustica Edw.—Skaget Valley, Princeton Summit. Rare.

Rusticus enoptes Boisd.—Princeton, July 12-14.

R. glaucon Edw.—Princeton.

R. melissa Edw.—Skaget Valley, Princeton Summit.

R. scudderi Edw.—Princeton.

R. acmon D. & H.—Princeton.

Everes amyntula Boisd.—Princeton Summit, July 16.

The Saturniid moth, *Pseudohazis Nuttalli* Streak., was common at one point on the trail. It flies only in the hottest sunshine, and is so strong and swift on the wing that it is very hard to catch. The moths were just emerging from the chrysalids when I was there, and I found several still moist imagoes, and a number of empty pupa-shells.

ENTOMOLOGICAL COLLECTIONS IN QUEBEC.

The Report of the Superintendent of Public Instruction of the Province of Quebec for the year 1908-09 states that in 1893 the Government of the Province purchased the collection made by the late Abbé Provancher. This collection is fairly large, and contains in Coleoptera alone 1,903 species, represented by 2,627 specimens. The great value of the collection, however, is the fact that it contains nearly all the type specimens on which the Abbé based his descriptions of hundreds of new species in different orders, especially in the Hymenoptera. The collection remains in the three cabinets in which he had himself arranged it, and has not been disturbed in any way. It is therefore available for inspection by students at any time, and may be seen by application in the Museum of the Department.

Another collection of great interest is that made by the Rev. Dr. Fyles during a long series of years that he spent in the neighbourhood of Quebec and in the Eastern Townships. It consists very largely of Lepidoptera. The specimens are said to be well mounted and in perfect order. There are amongst them some few types of species that he described.

Among the curiosities of the Museum is an immense Tiger-beetle, two and one-half feet long and one and one-half feet high. It is a reproduction in shape and colour of *Cicindela purpurea*, and was made by a wood-carver in Quebec in 1876, and exhibited at the Colonial and Indian Exhibition held in London that year.

It is satisfactory to know that the collections in Quebec are being carefully looked after by the Abbé Huard, who is an enthusiastic entomologist.

C. J. S. B.

NOTE ON CHIONOBAS GIGAS BUTLER.

BY E. P. VENABLES.

Mr. Cockle's note on the occurrence of *Chionobas gigas* at Kaslo at an altitude of 1,800 feet, is of interest. I also have taken the species in 1908 in the Okanagan Valley, twelve miles east of Vernon, altitude 1,000 feet, in open meadow land near water. On this occasion I saw two or three more individuals at the same spot, but failed to capture them.

I also observed the species on the mountain side above the valley in 1909—"a single individual." It is evident from these observations that the range of this species is not confined to the high altitudes alone.

INCIDENTAL CAPTURES OF COLEOPTERA AT PLANO,
TEXAS.

BY E. S. TUCKER,

Bureau of Entomology, U. S. Dept. Agric.

The following list gives the determinations and records of beetles which, together with insects in other orders, were personally collected during the time I was stationed at Plano, Collin County, Texas, lasting from the first week in May to the end of December, 1907. For the sake of convenience, the arrangement follows the "List of Coleoptera," by Samuel Henshaw, but includes recent changes in nomenclature, and especially the revised family names as adopted by the European authorities, L. V. Heyden, E. Reitter and J. Weise, in "Catalogue Coleopterorum Europæ."

The asterisk (*) when used after a specific name indicates determination or verification by Mr. E. A. Schwarz, whose helpful services, through the courtesy of Dr. L. O. Howard, are hereby gratefully acknowledged.

SUMMARY OF FAMILIES AND SPECIES, INCLUDING VARIETIES :

Cicindelidæ	2	Bostrychidæ	4
Carabidæ	23	Lyctidæ	1
Dytiscidæ	2	Scarabæidæ	15
Hydrophilidæ	4	Cerambycidæ	8
Pselaphidæ	1	Chrysomelidæ	22
Staphylinidæ	5	Lariidæ	3
Phalacridæ	4	Tenebrionidæ	7
Coccinellidæ	9	Cistelidæ	1
Erotylidæ	2	Lagriidæ	1
Cucujidæ	4	Melandryidæ	1
Mycetophagidæ	1	Cedemeridæ	1
Dermestidæ	1	Mordellidæ	6
Nitidulidæ	3	Anthicidæ	3
Latridiidæ	1	Meloidæ	5
Trogositidæ	1	Otiorhynchidæ	1
Dryopidæ	1	Curculionidæ	16
Elateridæ	4	Calandridæ	4
Buprestidæ	4	Ipidæ	1
Cantharidæ	4	Anthribidæ	1
Cleridæ	1		

Totals : 39 families, 178 species.

July, 1910

Family CICINDELIDÆ.

Tetracha Carolina L.—July and August, all at night, taken at trap light.
Cicindela punctulata Fab.—July and September, all at night, taken at trap light.

Family CARABIDÆ.

Pasimachus Californicus Chd.—July, August and September.
Scarites subterraneus Fab., var. *texanus* Chaud.*—July and August.
Clivina Texana Lec.*—August, at night, taken at trap light.
 bipustulata Fab.—May, July.
Tachys tripunctatus Say.*—July.
Pterostichus Sayi Brulle.—August, at night, taken at trap light.
Evarthrus gravidus Hald.—June.
 sodalis Lec.—May, July, September, October and November.
Lebia pulchella Dej.*—May, at dusk, in oat field.
 analis Dej.—May, at dusk, in oat field.
Loxopeza (Lebia) grandis Htz.—July and August, at night, taken at trap light.
Calleida decora Fab.—July, in oat field ; July and August, at night, taken at trap light.
Helluomorpha Texana Lec.—July.
Brachynus sp.—July, at night, taken at trap light ; August.
Agonoderus pallipes Fab.—July and August, at night, taken at trap light.
 testaceus Dej.*—May, at dusk, in oat field.
 micros Lec.*—May, at dusk, in oat field ; July, August, September, at night, taken at trap light.
Discoderus parallelus Hald.*—July, November.
Stenomorphus rufipes Lec.—October, in oat field ; November.
Harpalus caliginosus Fab.—July.
 Pennsylvanicus DeG.—July to September, at night, taken at trap light ; October, in oat field.
 gravis Lec.—August and September, at night, taken at trap light.
Anisodactylus opaculus Lec.—July, at night, taken at trap light.

Family DYTISCIDÆ.

Laccophilus fasciatus Aubé.*—July, at night, taken at trap light.
Copelatus chevrolatii Aubé.—August, at night, taken at trap light.

Family HYDROPHILIDÆ.

Tropisternus nimbatus Say.—October, at night, taken at trap light.

Berosus subsignatus Lec.—July to September, at night, taken at trap light, and a single specimen at random in August.

Philhydrus ochraceus Mel.*—August, at night, taken at trap light.

Phænonotum extriatum Say.*—August, at night, taken at trap light.

Family PSELAPHIDÆ.

Atinus monilicornis Brend.*—August, at night, taken at trap light. Mr.

Schwarz added remark: "It is a rare species and strictly myrmecophilous."

Family STAPHYLINIDÆ.

Trichiusa robustula Casey, det. Casey.—May, at dusk, in oat field.

Atheta sp., undescribed, det. Casey.—November.

Philonthus hepaticus Er.*—May, August, at night, taken at trap light.

Stenus colonus Er.*—August.

Dacnochilus argularis Er.*—July.

Family PHALACRIDÆ.

Phalacrus penicillatus Say.—June, in oat field.

politus Melsh.—September, at night, taken at trap light.

Eustilbus (*Olibrus*) *apicalis* Melsh.—May, at dusk, in oat field; June, common in oat fields.

Acylomus ergoti (Walsh) Casey.*—May, at dusk, in oat field. Mr. Schwarz remarked: "The insect is the old *Olibrus ergoti*, so named by Mr. B. D. Walsh many years ago, but not described by him. It was described by Casey as *Acylomus ergoti*. It is an extremely common and widely-distributed species living in the smut fungi (ergot) that are so common on graminaceous plants."

Family COCCINELLIDÆ.

Megilla maculata DeG.—May, in oat field; June and July, invading experiment cages with green bugs, *Toxoptera graminum* Rond., in oat fields; August to December, bred in experiments.

Hippodamia convergens Guer.—June, invading experiment cages with green bugs in oat fields; July, in oat fields and at random; October, November, in oat field.

Coccinella oculata Fab., melanistic form of *abdominalis* Say.—July, in corn field near infestation by *Aphis maidis* Fitch; October, in old corn field.

Cycloneda (*Coccinella*) *munda* Say.—October.

Psyllobora vigintimaculata Say.—August.

vigintimaculata Say, race *tædata* Lec.—August, November 1st, pairing on broom-weed.

Chilocorus bivulnerus Muls.—November.

Scymnus Loewii Muls.—June, invading experiment cages with green bugs ; July, in wheat-stubble field ; August, breeding in experiment cage with green bugs and taken at random ; October, December. A troublesome enemy encountered in the breeding of *Toxoptera graminum* Rond., in field cages.

Mr. Schwarz refers to this beetle as a common Mexican species, and considers it identical with *Lecontei* Cr. (= *cinctus* Lec.), and which has several other synonyms not yet mentioned in print.

partitus Casey.—August. Only one specimen taken, which shows it to be comparatively rare besides *Loewii*.

Family EROTYLIDÆ.

Languria mozardi Latr.—June, in oat field ; July, in wheat-stubble field.

Megalodacne fasciata Fab.—July, sweeping at night.

Family CUCUJIDÆ.

Silvanus Surinamensis L.—June, in flour ; August, appearing in kitchen.

Cathartus cassiæ Reiche (*gemellatus* Duv.).—July, on ear sweet corn.

advena Waltl.—July, in oat field.

Læmophlœus minutus Oliv. (*pusillus* Schh.).*—July, in seed wheat with *Calandra oryzae* L.

Family MYCETOPHAGIDÆ.

Typhæa stercorea L. (*fumata* L.).—June, in oat field ; July, August, at night, taken at trap light.

Family DERMESTIDÆ.

Trogoderma ornatum Say.—June and July, in window of house ; July, in corn field.

Family NITIDULIDÆ.

Carpophilus dimidiatus Fab.*—December, on oat plant.

Conotelus stenoides Murr.—October, thick on ears and shucks of June-planted corn.

Nitidula zigzag Say.*—July, at night, taken at trap light.

Family LATRIDIIDÆ.

Melanophthalma distinguenda Com.—June and July, in oat fields.

Family TROGOSITIDÆ.

Temnochila cœrulea Oliv. (*virescens* Fab.).—July, at night, on old log.

Family DRYOPIDÆ (PARNIDÆ).

Stenelmis vittipennis Zimm.*—August, at night, taken at trap light.

Family ELATERIDÆ.

Drasterius cribratus Lec.—August, at night, taken at trap light.

Glyphonyx testaceus Melsh.—July, at night, taken at trap light.

Melanotus fissilis Say.—August, at night, on old log.

Scaptolenus Lecontei Sallé.—October, at night, taken at trap light ;
November.

Family BUPRESTIDÆ.

Dicerca obscura Fab.—October and November, sunning on iron frame of
windmill.

Buprestis rufipes Oliv.—July.

Chrysobothris femorata Fab., var. *Lesueuri* L. & G.*—August.

Agrilus egenus Gory.*—July.

Family CANTHARIDÆ (LAMPYRIDÆ).

Photinus dimissus Lec.*—July, at night, taken at trap light.

benignus Lec.—May, at dusk, in oat field ; June, sweeping at
night ; July, at night, taken at trap light ; August.

Pleotomus pallens Lec.—July.

Lobetus abdominalis Lec.—August, September.

Family CLERIDÆ.

Hydnocera pubescens Lec.—July, in oat field.

Family BOSTRYCHIDÆ.

Endecatomus rugosus Rand.*—November.

Xylobiops basilaris Say.—August, at night, taken at trap light.

Prostephanus (*Dinoderus*) *punctatus* Say.*—August, at night, taken at
trap light.

Rhizopertha dominica Fab. (*Dinoderus pusillus* Fab.).*—November, bred
in meal.

Family LYCTIDÆ.

Lyctus (*Trogoxylon*) *parallelopipedus* Melsh.—September.

Family SCARABÆIDÆ.

Canthon humectus Say (*cyanellus* Lec.).—May, a pair, rolling dung-
ball ; July.

lævis Dru.—July.

Pinotus (Copris) carolinus L.—August.

Phanæus triangularis Say.*—July.

igneus MacL.—July, September.

Atænius cognatus Lec.*—July and August, at night, taken at trap light.

Aphodius lividus Oliv.—July and September, at night, taken at trap light.

inquinatus Hbst.—October, in window ; November, common in green wheat and oat fields.

lutulentus Hald.*—November.

Lachnosterna lanceolata Say.—June.

torta Lec.—July to September, at night, taken at trap light and prevalent in foliage of elm trees.

glabricula Lec.*—July and August, at night, taken at trap light.

Cyclocephala immaculata Oliv.*—July, at night, taken at trap light.

Phileurus valgus Fab.—May, at night, taken at trap light.

Allorhina nitida L.—July, in clusters on base of sunflowers ; August, on willow.

Family CERAMBYCIDÆ.

Mallodon dasystomus Say.—July, at night, from old logs ; August.

Smodicum cucujiforme Say.—July, at night, taken at trap light and on bark of tree.

Eburia quadrigeminata Say.—July, at night, on bark of tree.

Ischnocnemis bivittatus Dup.—October and November.

Neoclytus luscus Fab.*—November, at roots of persimmon.

Oncideres cingulata Say.—August, November, on fallen elm twig which had been girdled. The work of this species on elm became quite noticeable about September 20, on account of ground beneath trees being littered with fallen girdled twigs.

Ataxia crypta Say.—October, at night, taken at trap light.

Tetraopes femoratus Lec.*—Typical form, according to Mr. Schwarz ; November.

Family CHRYSOMELIDÆ.

Donacia proxima Kirby.*—August, at night, taken at trap light.

Anomœa laticlavata Forst.—June and July.

Exema conspersa Mann.—May, August, at night, taken at trap light.

Diachus auratus Fab.—May.

Myochrous denticollis Say.—June, in oat field ; August, at night, taken at trap light ; November.

Nodonota tristis Oliv.*—July, in wheat-stubble field and at random.

Leptinotarsa decemlineata Say.—July, on *Solanum rostratum* in corn field.

Chrysomela auripennis Say.—July, in oat field ; October, November.

Plagiodera viridis Melsh.*—May.

Luperus Brunneus Cr.—May, July, at night, taken at trap light.

Diabrotica duodecimpunctata Oliv.—May, in oat fields and at random ;
July, in corn fields and at random, and at night taken at trap
light ; August at random ; August and September, at night,
taken at trap light ; October.

Hypolampsis pilosa Ill.*—July.

Homophoea æquinoctialis L.—July.

Cedionychis Texana Cr.*—November.

Disonycha glabrata Fab.—July, in corn field.

abbreviata Melsh.—November.

Haltica ignita Ill.—August, at night, taken at trap light.

Crepidodera atriventris Melsh.—July, in wheat-stubble field.

Epitrix parvula Fab.—June.

Mantura Floridana Cr.—November.

Chætocnema pulicaris Melsh.*—May, at dusk, in oat field ; August,
October, at night, sweeping ; November.

Microrhopala vittata Fab.*—August.

Family LARIIDÆ (BRUCHIDÆ).

Laria (*Bruchus*) *protracta* Horn.—July, at night, taken at trap light.

bisignata Horn.—July, in wheat-stubble field.

schrankiæ Horn.—July, in oat-stubble field.

Family TENEBRIONIDÆ.

Eleodes Texana Lec.*—July and August, at night, from rotting logs.

tricostata Say.*—October.

Alobates Pennsylvanica DeG.*—July and August, at night, from rotting
logs.

Opatrinus aciculatus Lec.*—August.

Tribolium ferrugineum Fab.—May, on ham in kitchen ; June, in flour ;
July, on kitchen shelves ; August, in kitchen ; November,
bred in meal.

Alphitobius diaperinus Panz.*—June, in flour.

Platydema ruficorne Sturm.—August, at night, taken at trap light.

Family CISTELIDÆ.

Lobopoda (*Allecula*) *punctulata* Melsh.—July, at night, on old logs.

Family LAGRIIDÆ.

Statira gagatina Melsh.*—May, at night, taken at trap light.

Family MELANDRYIDÆ.

Eustrophus bicolor Say.—July and August, at night, on old logs.

Family CEdemeridÆ.

Oxaxis cana Lec.*—June, at night, taken at trap light; July, at night, taken at trap light.

Family MORDELLIDÆ.

Mordella octopunctata Fab.—July.

carinata Smith.*—July.

Mordellistena guttulata Helm.*—June and July, in oat fields.

nubila Lec.*—August.

pustulata Melsh.*—August, at night, taken at trap light; August at random.

unicolor Lec.*—July, in oat field; August, at night, taken at trap light.

Family ANTHICIDÆ.

Notoxus monodon Fab.—August.

Anthicus floralis L.*—July, at night, taken at trap light.

lætus Laf.*—August, at night, taken at trap light.

Family MELOIDÆ.

Macrobasis immaculata Say.*—August, at night, taken at trap light; October.

Epicauta sericans Lec.—July, in oat and corn fields and at random.

lemniscata Fab.—July to September, at night, taken at trap light.

Pennsylvanica DeG.—August, November.

Pyrota terminata Lec.—August and September, at night, taken at trap light.

Family OTIORHYNCHIDÆ.

Graphorhinus vadosus Say, det. Pierce.—November.

Family CURCULIONIDÆ.

Apion ellipticum Smith.—May, October.

occidentale Fall.—July, in oat-stubble field.

Macrops Wickhami Dietz.—August, at night, taken at trap light.

Lixus scrobicollis Boh.—July.

Smicronyx (Desmoris) *constrictus* Say.—August, at night, taken at trap light.

sordidus Lec.—August, at night, taken at trap light.

Pnigodes setosus Lec.—November, emerged in field-cage over oat plants and at random.

Anthonomus grandis Boh.—October, common on green cotton balls.

æneolus Dietz.—July, in wheat-stubble field.

Conotrachelus nenuphar Hbst.—June and July, larvæ commonly infesting peaches.

seniculus Lec.—July and August, at night, taken at trap light.

Cylindrocopturus longulus Lec., det. Pierce.—June, in oat field.

Ceutorhynchus Zimmermanni Gyll.—May.

Baris transversa Say.—July, in oat field and at random.

Trichobaris Texana Lec.—August.

Balaninus Victoriensis Chttn.—October, in cotton field ; November.

Family CALANDRIDÆ.

Rhodobæus tredecimpunctatus Ill.—August.

Sphenophorus sp.—Specimen lost, but probably *maidis* Chttn., which has since been taken in the corresponding month. July.

Calandra oryzae L.—July, in seed wheat.

Cossonus corticola Say.—June.

Family IPIDÆ. (SCOLYTIDÆ.)

Platypus compositus Say.—November.

Family ANTHRIBIDÆ.

Brachytarsus alternatus Say.—June, in oat field.

Dr. PHILIP P. CALVERT, Assistant Professor of Zoology in the University of Pennsylvania, and Mrs. Calvert, arrived in Philadelphia on May 17, from Costa Rica, after a year's residence in that country. They were in Cartago, their headquarters, at the time of the earthquake of May 4, which totally destroyed that town, but escaped unhurt. A brick partition wall fell into the room in which they were sitting, burying and destroying the living insect larvæ which were in rearing, some of the experiments having run for eleven months. On the following day they were able to recover from the ruins nearly all their other collections, notes, photographs, instruments, etc., and later to bring them home in safety. Many data on the seasonal distribution, larval forms and habits of Costa Rican Odonata (the principal objects of their investigations) have been secured.—*Science*.

A NEW SPECIES OF THE GENUS LEUCOPIS.

BY W. R. THOMPSON.

Bureau of Entomology, U. S. Dept. of Agriculture.

This interesting little Agromyzid genus does not appear to contain a great number of species, and but four have been recorded from America hitherto. These, together with the new form described in this paper, are included in the following table. It will be noted that they differ mainly in the character of the markings of the mesonotum and abdomen :

TABLE OF SPECIES.

- | | |
|---|--------------------------|
| 1. Dorsum of thorax immaculate..... | 2 |
| Dorsum of thorax with two brown vittæ..... | 3 |
| 2. Abdomen immaculate..... | <i>simplex</i> Loew. |
| Abdomen with two lateral spots and a median basal vittula of velvety-black upon the second, third and fourth segments.. | <i>maculata</i> , n. sp. |
| 3. Second abdominal segment with two lateral brown spots, third and fourth segments immaculate..... | <i>nigricornis</i> Egg. |
| Third and fourth abdominal segments not immaculate..... | 4. |
| 4. Two lateral spots and a basal median vittula on the second abdominal segment, only the basal vittula on the third and fourth segments..... | <i>bella</i> Loew. |
| Two lateral spots and a basal median vittula on second, third and fourth segments..... | <i>bellula</i> Will. |

Since the number of species in the genus is so small, and for greater convenience, the full descriptions, compiled from the original sources, are given below :

Leucopis nigricornis Egger.

Egger, Verh. Zool.-Bot., XII, p. 782, 1862.

♂ ♀.—Lead-gray, antennæ large, black, thorax bistrate, all of the tarsi yellowish, wings whitish. Length, $1\frac{1}{2}$ lin.

Antennæ large, black, cheeks, front and vertex ashen-gray, the front above the antennæ with an arched groove, which continues on both sides into the facial grooves, the vertex with three long, slightly impressed lines. Thorax, scutellum and abdomen bluish-gray, the thorax with two, not broad, convergent vittæ on the middle of the dorsum, the abdomen with two black spots. Venter whitish-gray, somewhat shining when viewed from anteriorly. Legs: coxæ and femora to the knees grayish, the knees golden, the tibiæ of the first and second pair of legs golden, those of the

July, 1910

hind legs in the middle broadly brownish. All of the tarsi golden, wings whitish.

(Trans. from original description.)

An examination of the specimens in the U. S. N. M. collections discloses considerable variation in the character of the thoracic vittæ in this species. They are in some specimens very strong and well marked, at times continued to the disc of the scutellum, in others so faint as to be discernible only after careful examination. The spots upon the second abdominal segment also vary considerably in size.

Leucopis simplex Loew.

Loew, Cent., VIII, No. 96, 1869.

♂.—Length of body, $\frac{3}{4}$ lin.; of wing, $\frac{5}{6}$ lin. Blackish, entirely covered with thickly-dusted whitish pollen, the antennæ and palpi black, legs blackish, base and apex of the tibiæ and the first four tarsal joints yellowish.

Colour of body black, uniformly concealed by white pollen, abdomen immaculate. Antennæ and palpi black in colour. Femora black, tibiæ blackish-fuscous, in the base broadly, in the apex less broadly yellowish, tarsi yellowish, but with the last joint only blackish-fuscous. Halteres whitish, wings hyaline, veins fuscous.

(Trans. from original description and compared with type.)

The colour of the legs in the specimens in the U. S. N. M. collections appears to vary somewhat, as some of the specimens have the base and apex only, and others the greater part of the femora yellowish. Many of the specimens, which otherwise agree with Loew's description, have the wings whitish dusted. One specimen which I found in the series, from Flagstaff, Arizona (H. S. Barber coll.), has the thorax immaculate, but there are two small black spots on the second abdominal segment; another from Sea Isle City, N. J., has the thorax immaculate, the abdomen with the characteristic markings of *L. bella*, the second abdominal segment bearing two lateral blackish spots, and a basal median vittula, the third and fourth with the basal median vittula only.

Leucopis bella Loew.

Loew, Cent. VI, No. 99 (1865).

♀.—Length of body, $11/12$ to 1 line; of wing, $11/12$ line. Whitish, thorax with two fuscous vittæ, first abdominal segment, except the margins, black, following segments each with a single minute median basal black spot, the second segment also bearing a black spot on each side.

Whitish, opaque, frontal vitta concolorous, on both sides margined with blackish. Antennæ black, whitish pollinose. Palpi black, proboscis yellowish. Dorsum of the thorax adorned with two uninterrupted vittæ, which slightly converge toward the posterior margin. Abdomen shining white, the first segment, except the margins, black, opaque. Second, third and fourth segments each with a single basal median vittula, the second also bearing a round black spot on each side. Legs black, whitish pollinose, knees and tarsi yellowish, the extreme apex of the latter a little darker. Wings milky, veins dilutely subfuscous.

(Trans. from original description, and compared with type.)

The specimens referred to this species in the U. S. N. M. collections do not show a great deal of variation in the character of the thoracic vittæ unless the specimen mentioned in the note under *P. simplex* be an immature individual of this species. The abdominal spots vary somewhat in size.

Leucopis bellula Will.

Williston, Insect Life, Vol. I, No. 8, p. 258 (1889).

Length, $1\frac{3}{4}$ –2 mm. Black, thickly grayish-white dusted. Front with two gently arcuate black stripes; the narrow orbital space perceptibly more whitish. Antennæ black, the basal joints shimmering whitish, arista short. Face in colour like the frontal orbits. Mesonotum with two conspicuous chocolate-brown stripes, beginning on the inner side of each humerus and gently converging to the posterior margin. In the middle of the dorsum, before the scutellum, there are two bristles; the usual bristles on the lateral margin and on the margin of the scutellum; none on the front or vertex. Abdomen more whitish than the thorax, clothed with short black hairs, first segment with the lateral margins and a posterior band deep brown, second and third segments each with a slender, subinterrupted stripe and a pair of rounded spots, all deep brown in colour, the pair on the second moderately large, on the third smaller, and on the fourth punctiform or minute. Legs black, with the same whitish pruinosity, the immediate tip of femora, the base of the front and hind tibiæ, the middle tibiæ and the tarsi, except their tip, yellow, the tibiæ elsewhere and the tip of the tarsi brown or infuscated; in some specimens the tibiæ throughout are more brown. Wings hyaline or faintly clouded; the auxiliary vein distinctly separated from the first longitudinal, except at tip, the last section of the fifth vein a little shorter than the penultimate one of the fourth.

The thoracic vittæ in the majority of the specimens of this species are dark and quite well marked, sometimes reaching to the hind margin

of the scutellum. The wings in some specimens are quite markedly whitish dusted.

An examination of the paratypes of this species in the U. S. N. M. collection makes it evident that there is a slight error, due to a slip of the pen, in the description quoted above. Instead of "first segment of the abdomen *with* the lateral margins and a posterior band deep brown," the description should read, "first segment of the abdomen, *except* the lateral margins and a posterior band, deep brown."

Leucopis maculata, n. sp.

♂ ♀.—Length, 2.5–2.75 mm. Ground colour black, thickly dusted with bluish-white pollen. Dorsum of the thorax without brown vittæ, with three parallel, narrow, light gray vittæ, running backward from the anterior margin of the mesonotum and fading out on its posterior half. First segment of the abdomen, except the margins, sometimes darker gray than the rest of the abdomen, the greater part of this segment bare, the margins and the remainder of the abdomen with short black hairs. Second, third and fourth segments each with a basal median vittula and two lateral spots of velvety-black. On the second segment the basal median vittula reaches about half way to the hind margin of the segment, tapering posteriorly. Lateral black spots small, irregularly circular, about one-third the length of the segment in diameter. Lateral spots on the third segment similar, the median vittula smaller, not reaching half way to the hind margin of the segment. Lateral spots on the fourth abdominal segment not half the size of those on the preceding segments, the median vittula very small, sometimes evanescent. Tibiæ, tarsi, and the apices of all of the femora luteous, the tarsi sometimes infuscate toward the tip. Femora, except the tips and sometimes the narrow bases, concolorous with the rest of the body. Face, front and cheeks thickly dusted with whitish pollen, palpi and antennæ black, the latter thinly dusted with whitish pollen. Wings milky, uniformly whitish dusted.

Described from four specimens, three ♂'s and one ♀, bred from *Eriopeltis coloradensis*, by Messrs. H. S. Smith and M. H. Swenk, at Calvert, Nebraska, Nov. 15, 1909. Type No. 13141, U. S. N. M.

The larvæ of this species were found feeding upon the egg-mass of the above-mentioned scale insect. They appear to be predatory in habit, somewhat resembling Syrphid larvæ in their mode of attack, like the other species of the genus of which the habits are known.

As will be seen from the above description, this species resembles *Z. bellula* Will. in the markings on the abdomen, but differs from it in the

absence of the pair of brown vittæ on the mesonotum. I have not been able to detect the slightest trace of this in any of my specimens. I describe this form as new with some hesitation, on account of the rather variable nature of the specific characters in our specimens of this genus. However, it is probable that this variation is due in part, at least, to the immaturity of bred specimens. Those from which the above description was taken are apparently quite well developed and the abdominal characters are well marked. They differ from the other species, moreover, in their slightly larger size.

NOTES ON TENTHREDINOIDEA, WITH DESCRIPTIONS OF NEW SPECIES.

BY S. A. ROHWER, WASHINGTON, D. C.

PAPER XII. — (Genus *HOPLOCAMPA* I.)

The genus *Hoplocampa* Hartig was described in 1837 (Fam. d. Blatt. und Holzwesp., p. 276), as a subgenus of *Selandria* Leach. It originally included eight species, but has since been restricted to species which are congeneric with *Tenthredo* (Allantus) *brevis* Klug. By different writers of Tenthredinoidea *Hoplocampa* has been treated differently, some placing it with *Hamichra* Stephens, while others have considered it more closely allied to *Phyllotoma* Fallén and *Ericetampoides* Konow. It is in many ways related to *Blennocampa* (and allies) on the one hand and *Nematus* (and allies) on the other. Perhaps it should form a distinct tribe, separated from the *Nematids* by the presence of a radial cross-vein, different shaped head and antennæ in the adult, and in having the larva 22-footed, as in *Blennocampids*. From the *Blennocampids* the adult differs in the position of the basal vein and the non-parallel first recurrent vein and other characters.

Characters of Hoplocampa Hartig.

Small species: clypeus emarginate or subtruncate: malar space wanting or present: antennæ 9 jointed, the pedicellum longer than wide: ocelli in a low triangle: orbits rather narrow, the vertex rounded: last ventral segment of the female produced in the apical middle: sheath of the normal type: hypopygidium large: post-basitarsis much shorter than the following joints: claws with a small inner tooth: mesothorax without sutures which separate præ-plutes: basal plates well separated: venation similar to the figure of *Hoplocampa ferruginea* (Fabricius), as figured on plate XXXIII, fig. 61, Proc. U. S. Nat. Mus., Vol. XXIX, No. 1438, 1906.

The larva have eight pairs of abdominal feet, and are known to feed on the following plants : *Prunus*, *Cratægus*, *Sorbus*, *Lonicera*, *Ribes* and *Amelanchier*.

Hoplocampa Hartig may be separated into two subgenera on the length of the malar space. The Nearctic species in some respects differ from the Palæarctic species, although there is a group of species in the west which are allies of the European species.

Subgenera of Hoplocampa.

Malar space as great as or greater than the width of the mandible at base ; eyes short, scarcely twice as long as wide ; ocelli in a low triangle..... *Macgillivrayella* Ashmead.

(Type : *Macgillivrayella Oregonensis* Ashmead.)

Malar space very narrow or wanting, never as great as the width of the mandible at the base ; eyes elongate, nearly three times as long as wide ; ocelli usually in a curved line..... *Hoplocampa* Hartig.

(Type : *Tenthredo* (*Allantus*) *brevis* Klug.)

Species of the subgenus Macgillivrayella Ashmead.

Females 1.

Males 2.

1. Transverse radius oblique and received distinctly beyond the middle of the third cubital cell ; (ocellar basin almost wanting ; stigma slightly broader at the base ; wings creamy-hyaline, iridescent) *Oregonensis*, Ashm.

Transverse radius nearly perpendicular and received near the middle of the cell..... *lacteipennis* Roh.

2. Venation pallid-hyaline ; hypopygidium not notched in the apical middle *Oregonensis* Ashm.

Venation, except stigma, pale brown ; hypopygidium notched in the apical middle..... *xanthura* Roh.

Hoplocampa (*Macgillivrayella*) *Oregonensis* Ashmead.

Macgillivraya Oregonensis Ashmead, CAN. ENT., XXX, 10, 1898, p. 257. (Mentioned as the type of genus *Macgillivraya*.)

Female : Length, 5 mm. Clypeus deeply, circularly emarginate, lobes rounded at the apex ; antennal foveæ large, extending both above and below, confluent with the supraclypeal fovea ; no complete supraclypeal line ; middle fovea not sharply defined, elongate ; no ocellar basin ; post-ocellar line straight and well defined ; lateral ocelli below the supraorbital line ; antennæ rather slender, the third joint subequal with the fourth ;

entire insect shining, impunctate; sheath straight above, obliquely truncate, and then tapering to the broadened base; stigma rounded on the lower margin, broadest a little basad of middle; transverse radius oblique and received at the apical third of the cell; upper discal cell slightly exceeding the lower on the outer margin. Entirely reddish-yellow, the antennæ above a little darker. Wings creamy-hyaline, iridescent; venation pallid-hyaline.

Male: Length, 4-4.5 mm. Hypopygidium much longer than wide, truncate at the apex. Agrees with the above description of the female.

Type locality: Mt. Hood, Oregon. Collector unknown.

Type: No. 12841. U. S. N. M.

Hoplocampa (Macgillivrayella) *xanthura*, n. sp.

Male: 4.75 mm. Very like *Oregonensis*, but the following differences are to be noted: Antennæ somewhat longer, emargination of the clypeus shallower, middle fovea smaller and almost wanting, a depressed area in front of the anterior ocellus, the scutellum with some small punctures, transverse radius short, perpendicular and received near the middle of the cell, parallel with the third transverse cubitus, tergum mostly black, venation, except the stigma, pale brown, stigma narrower and gently rounded beneath, hypopygidium with the lateral angles more strongly rounded and a narrow notch in the middle.

Type locality: Montana. Collector unknown.

Type: No. 12842. U. S. N. M.

Hoplocampa (Macgillivrayella) *lacteipennis*, n. sp.

Female: Length, 4.5 mm. Clypeus very shallowly emarginate; supraclypeal line distinct, well defined; antennal foveæ not as large as in *Oregonensis*; antennal furrows complete to the ocelli; middle fovea elongate and connected with the ocellar furrow; postocellar furrow present, but not well defined; antennæ a little longer than in *Oregonensis*; mesonotum with a few scattered, small punctures; end of the abdomen mashed so the characters of the sheath cannot be made out; stigma broad, as in *Oregonensis*; transverse radius nearly perpendicular and received in about the middle of the third cubital cell; upper discal cell of the hind wings slightly exceeding the lower on the outer margin. Reddish-yellow with a brownish tint; wings milky-hyaline, veins pallid-hyaline.

Type locality: Mass. Collector unknown.

Type: No. 12843. U. S. N. M.

[NOTE.—The subgenus *Hoplocampa* will be treated in the next paper of this series.

SYNOPTIC TABLE OF THE SPECIES OF *AULICUS* (COL.).

BY A. B. WOLCOTT, CHICAGO, ILL.

The genus *Aulicus*, as now restricted, is confined to North, Central and South America, the various species giving the genus a geographical range which extends from Texas to Colombia. The Australian species formerly placed in *Aulicus*, but which are not congeneric with our species, have been referred to the genus *Phlogistus* Gorham.

During the progress of some studies of American Cleridæ, the writer found it expedient to construct a table of the known species, which is here presented, with the hope that it may be of service to others.

A. Eyes finely granulate, broadly, deeply, angularly marginate
in front (*Aulicus*, sens. str.).

B. Small species (2.5-3.0 mm.). Cuba.

C. Elytra at base gibbous.

D. Head and anterior half of thorax red ; elytra
black, with markings wanting ; antennæ
yellow *basicollis*.

CC. Elytra at base not gibbous.

E. Head and thorax fuscous, with small white
maculations; antennæ pale . . . *alboguttulatus*.

EE. Head, prothorax and antennæ red . . *bilineatus*.

BB. Larger species (6.2-13.2 mm.). North American Continent.

F. Head and thorax (wholly or in part) red.

G. Form elongate ; elytra moderately
widening posteriorly, coarsely
and densely punctate. . . *monticola*.

GG. Form broader ; elytra with sides
more strongly rounded, finely
but densely punctate . . . *Coffini*.

FF. Head black or blue-black, with metallic
lustre.

H. Thorax broad ; elytra finely
punctate, each elytron with
two nearly obsolete
costæ *nero*.

HH. Thorax narrower ; elytra more
coarsely punctate, each elytron
with four feebly developed
costæ *thoracicus*.

- AA. Eyes coarsely granulate, with rounded emargination in front (*Muisca*, sub. gen.)
 a. Red; eyes, tips of mandibles, and two interrupted elytral fasciæ black. Length, 8 mm., Colombia..... *biteniata*.

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 7. *A. thoracicus* Schklg., Deutsch. Ent. Zeitschr., 1907, p. 305. Mexico (Guerrero).
 Subgen. *Muisca* Spin., Mon. Cler., II, 1844, p. 147.
 8. *A. (M.) biteniatus* Spin., Mon. Cler., II, 1844, p. 148; Gorh., Cist. Ent., 1876, p. 84. Colombia.

NEW SPECIES AND VARIETIES OF NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BARNES, S. B., M. D., AND J. B. MCDUNNOUGH, PH. D.,
 DECATUR, ILL.

(Continued from page 213.)

Prothrinax ocellata, n. sp.

♂.—Palpi and front brownish-yellow; vertex, collar, thorax and patagia blackish, with a strong admixture of gray scales; upturned tips of patagia and metathoracic tuft brownish; collar crossed posteriorly by a darker band. Abdomen deep brown, lighter underneath. Primaries brownish-yellow, largely obscured, however, by lilac-gray and purplish-black, leaving the ground colour visible only in the submarginal and

marginal areas, and as a narrow, oblique, ill-defined band from middle of inner margin to base of wing. Costal half of base largely whitish, followed along costal margin by a blackish shade, which extends beyond reniform, and fades gradually towards apex and disk into purplish-gray. T. a. line visible only as an indistinct blackish line, separating the white basal shade from the darker portion following, perpendicular to costa for short distance, thence outcurved to a point below cubital vein, touching orbicular at its lower basal extremity. T. p. line, from well beyond reniform, defines sharply the purplish-gray shade outwardly, and proceeds in a series of decreasing curves to below cubitus, where it joins t. a. line. Ordinary spots very distinct; orbicular large, circular, black, filled with gray scales and surrounded by gray band, which in turn is ringed with black; reniform oval, similar to orbicular, but outer black line is not continuous, being open towards apex between veins M_1 and M_3 . Claviform a slight black wedge-shaped mark, crossed by t. a. line. The basal half of inner margin below anal vein is occupied by a purplish-black patch, which extends upwards at base as far as median vein. The anal angle is occupied by a patch of similar colour, bordered inwardly by a whitish semicircular line. Both these patches are much rougher in scaling than the rest of wing. Veins scaled with black, most prominent near apex of wing. Vein M_2 bordered with black at outer extremity, at which point an indistinct smoky shade proceeds inward across the yellowish ground colour. Fringes yellow, checkered with black.

Secondaries white, with a small black discal spot; veins prominently marked with blackish-brown. Fringes white, bordered by a blackish basal line, which towards costa becomes broken into spots. At extremity of vein Cu_2 a smoky shading.

Beneath, primaries whitish, with prominent black distal spot and blackish shading along costa, markings of upper side showing slightly through wing. Secondaries as above, discal spot more prominent.

Expanse, 35 mm.

Habitat.—Redington, Ariz.

Type, 1 ♂, coll. Barnes.

This species belongs to the new genus *Prothrinax*, created by Hampson (Cat. of Lep. Phal., Vol. VIII, p. 225) for *luteomedia* Sm., with which species it bears a great superficial resemblance. Apart from its much greater size, it may, however, be readily distinguished from *luteomedia* by its prominent reniform, the lack of the apical black shading, and by the black veining of secondaries.

Provia, n. gen. (Type *P. argentata*.)

Proboscis moderately strong; palpi upturned to just beyond front, with long hairs beneath; front smooth, rounded, densely clothed with smooth short hairs; eyes prominent, rounded; antennæ of both sexes finely ciliate, more prominently so in male sex; fore tibia short, thickly haired, with long curved claw at extremity; head and thorax clothed with long rough hair, untufted; abdomen smooth. Fore wing narrow, broad at base, outer margin rounded; vein R_1 from middle of cell, areole present, R_3 and R_4 stalked, together with R_5 from apex of areole, vein M_1 from upper end of cell, veins M_2 and M_3 and Cu from near angle of cell. Hind wings with veins R and M_1 slightly stalked, M_3 and Cu from angle of cell.

This genus is closely allied to *Eutolyte* Grt., and *Copipanolis* Grt., differs, however, from both in the stronger proboscis, the lack of the corneous process of fore tibia, and in antennæ of male being ciliate and not pectinate. In thoracic vestiture it more nearly approaches *Copipanolis*, whilst the shape of wing resembles that of *Eutolyte*.

Provia argentata, n. sp.

♂.—Palpi gray, with black hairs; front yellowish-white; vertex, thorax and patagia largely gray, with black stripes; abdomen smoky brown; legs gray, with patches of long black hairs at base. Primaries smoky-brown, darkest in central portion of wing, and shaded along costa and inner margin with gray. None of the transverse lines are present, but the ordinary spots are very prominent. The orbicular is small, horizontally oblong, black, thinly outlined with silvery-white; reniform large, upright, black, edged with white and with a few pale scales in centre. From its base a silvery patch extends for a short distance outwards, the outer margin of which is deeply notched; from the upper tooth a blackish shade extends to outer margin, continued towards apex as a series of decreasing black spots; claviform silvery-white, edged with black, and preceded by a thick black basal dash, through which the anal vein is traceable as a thin white line. Outer margin occupied by a series of irregular white patches, not prominent at apex, but more or less confluent towards anal angle; veins scaled with black towards extremity, fringes smoky-brown, interrupted with white opposite veins. Secondaries whitish; veins distinctly marked in brown.

♀.—Similar to male; somewhat darker in ground-colour on primaries; secondaries deep smoky-brown, with white fringes.

Expanse, 34 mm.

Habitat.—Eureka, Ut. (Spalding), 2 ♂♂'s, 1 ♀.

Types, coll. Barnes.

Perania, n. gen. (Type *P. dissociata*.)

Proboscis moderate ; palpi upturned to well beyond front ; front with large conical process, sharp at apex, and hollowed out on under side at base, which is tuberculate ; eyes naked, fairly prominent ; vestiture largely scaly ; thorax but slightly tufted ; abdomen tufted on basal segments ; fore tibia smooth, without apical claw ; fore wing rapidly broadening from base to apex, outer margin rounded, areole small, diamond-shaped ; veins R_3 and R_4 stalked, together with R_5 from apex of areole ; M_1 from close to apex of cell ; M_2 , M_3 and Cu from lower angle of cell ; secondaries with veins R and M from upper angle of cell ; M_3 and Cu from lower angle ; M_2 parallel to M_3 .

This genus approaches nearest to *Achatodes* Gn., in general structure, but in outward appearance *dissociata* is widely different from *A. zeca* Har., and has in fact much more superficial resemblance to the *Stibadium* group.

Perania dissociata, n. sp.

♀.—General ground-colour olivaceous brown ; vertex, collar and posterior portion of metathorax lighter in colour than patagia and thorax ; antennæ with small tuft of whitish hairs at base. Basal half of primaries much darker in colour than remainder of wing. This darker colour is sharply defined outwardly by a still deeper shade proceeding from middle of costa to lower angle of cell, thence to middle of inner margin, an angle slightly greater than 90° being thus formed at junction of veins M_3 and Cu. The t. p. line is faintly discernible as a geminate line, composed of a series of lunules, arising on costa at three-quarters of the distance from base to apex, and strongly outcurved to vein M_3 , thence incurved to vein Cu_2 , approaching the dark median shade, with which it runs parallel to inner margin. Outer margin shaded with darker olive ; veins scaled with black at outer extremities. Secondaries smoky, darker along outer margin. Underneath light ochreous, slightly darker in cell on primaries, otherwise without markings.

Expanse, 34 mm.

Habitat.—Provo, Ut. (Spalding), 2 ♀ ♀'s.

Type, coll. Barnes.

Euxoa xasta, n. sp.

Palpi yellowish-gray, upturned ; front protruding, gray, mingled at vertex with black ; collar, thorax and patagia gray, with darker shading, the former with a black transverse band, abdomen lighter.

Primaries ochreous, shaded with darker, costa and inner margin gray ; a narrow black basal dash inclined slightly upward ; ordinary spots prominent, orbicular gray, filled with darker shade, and outlined with black, except basally, where the black marginal lines proceed for a short distance parallel to each other towards the base. Reniform well scalloped outwardly, margined with black opposite orbicular, the space between the two spots slightly darker than ground colour. Claviform outlined in black ; a submarginal row of black dashes in interspaces, most prominent in central portion of wing ; marginal area considerably darker than remainder of wing, and terminated by fine black line, slightly lunate in interspaces, second anal vein black from base to margin ; cubitus gray as far as reniform ; all veins blackish in submarginal area, veins M_3 and Cu being prominently bordered with gray. Fringes smoky, with a fine yellow basal line and a darker median shade. Secondaries white at base, with a broad smoky-brown border and a brownish lunule at end of cell, fringes white. Beneath, primaries yellowish-white, with spot at end of cell, and costa and outer margin sprinkled with brown ; secondaries white, costa with brown sprinkling ; slight spot at end of cell.

Expanse, 33 mm.

Habitat.—Kerrville, Texas, 2 ♀ ♀'s.

Type, coll. Barnes.

This species is allied to *E. Hollemanni* Grt., is, however, considerably lighter in general appearance ; the reniform and orbicular are distinctly separate, whereas in typical *Hollemanni* (we possess specimens compared with type) they are fused ; the claviform is also present in our species, and the black basal dash less prominent.

Stibadium mavina, n. sp.

♂.—General colour ochreous, moderately frosted with white and brown scales. T. a. line scarcely perceptible, marked on costa at about one-third of the length by a slight patch of whitish scales. T. p. line narrow, white, angled outwardly near costa, thence oblique and nearly parallel to margin. Median space brighter yellow, contrasting especially with submarginal portion of wing. Ordinary spots practically indistinguishable, very faintly outlined with white. Slight whitish mark proceeding obliquely downwards from costa near apex. Secondaries lighter than primaries at base, shading into darker towards margin. Fringes and thorax concolorous with wings. Beneath, without markings, sprinkled with darker scales along costa and outer margin, especially on secondaries.

Habitat.—Provo, Ut. (Spalding).

Type, 1 ♂, coll. Barnes.

This species most nearly approaches *spumosum* Grt., but its indistinct maculation and ochreous colour readily distinguish it from this species.

Catocala Beutenmuelleri, n. sp.

Ground colour of primaries an even bluish-gray, slightly shaded with darker, especially on outer margin. A black subbasal slightly dentate line extends half across wing at base, and is terminated by a black basal dash. The t. a. line is geminate, composed of a series of outcurved lunules, extending from costa at about one-quarter of its length to middle of inner margin, and shaded outwardly in costal portion with black; very prominently toothed basally on second anal vein; reniform yellowish, central portion outlined with darker, slightly toothed at apex and preceded on costa by two dark shades, the basal one of which is most prominent; subreniform similar in colour, faintly outlined with black; t. p. line single, black, with two prominent teeth beyond cell, the upper of which is much the larger; the inward bend along second anal vein extends nearly to t. a. line, and thence outwardly to a point on inner margin two-thirds from base; outwardly this line is bordered by a brownish shade, followed by bluish-gray; marginal area shaded with blackish, and containing a series of elongate black spots; fringes shaded with smoky. Secondaries orange-vermilion, median black band fairly broad, somewhat attenuate in central portion, sharply angled and not reaching inner margin; black marginal band broadest at costa, dentate at anal angle, bordered outwardly with vermilion, most prominent near costa and shortly before anal angle; fringes white, marked with black on central portion of wing. Beneath, primaries reddish, with broad black median and terminal bands; inner margin and basal portion of cell shaded with black. Secondaries as above, lighter on costal portion, no vermilion colour exterior to marginal band. Head and thorax bluish-gray, collar crossed by darker bands. Abdomen reddish, tufted with gray on anal segment.

Expanse, 47 mm.

Habitat.—Provo, Ut. (Spalding), 3 ♂♂'s, 1 ♀.

Type, coll. Barnes.

This species closely approaches *verrilliana* Grt., and in markings is practically identical. It may be distinguished by the bluish-gray colour of primaries and their much more uniform appearance, the contrasting shades of *verrilliana* being almost totally lacking. It is probably merely a racial form of this species. There is a tendency in the primaries to become rather suffused, the markings losing the clear-cut appearance of the typical specimens. We take pleasure in naming this species after Mr. W. Beutenmueller, who has contributed so much to our knowledge of this group.

Gloveria sphingiformis, n. sp.

♂.—General ground colour deep chocolate-brown; antennæ strongly bipectinate to tip; primaries narrow, elongate, costa rounded at apex, outer margin slightly concave, rounded at inner angle, colour darkest at base and in discal cell; a prominent whitish spot at end of cell, beyond which the central area of wing is semitransparent, bordered outwardly by a strongly dentate black band, which extends across wing from near apex to anal angle; in the upper portion inwardly this black band is shaded with yellowish-white, some traces of which colour are also visible outwardly near angle. Secondaries uniformly deep chocolate, fringes yellowish. Under side similar to upper, semitransparent area of primaries more extended at anal angle, and washed with yellowish; black band almost obsolete.

Expanse, 64 mm.

Habitat.—Kerrville, Tex. (Lacy), 1 ♂.

Type, coll. Barnes.

This species stands midway between *Arizonensis* Pack., and *gargamela* Stkr., approaching the former species in wing shape and the latter in coloration. The uniform colour of secondaries renders it readily distinguishable from allied species.

Lagoa Lacyi, n. sp.

♂.—Palpi, base of fore legs, last joint of tarsi, and a small fringe of hairs around eyes black, otherwise of a yellowish-cream colour, slightly darker along costal margin of primaries, especially underneath. At the apex of cell and at junction of veins M_4 and M_5 a small brownish spot, not repeated on under side. The long crinkly hairs show a slight tendency to deepen in colour at base of wing and irregularly on the disk.

Expanse, 27 mm.

♀.—Without yellowish tinge of ♂, creamy-white, in other respects similar.

Expanse, 35 mm.

Habitat.—Kerrville, Texas; Shovel Mt., Tex. Described from 1 ♂ and 10 ♀ ♀'s.

Type, coll. Barnes.

Lagoa crispata, ab. *grisea*.

The ground colour of primaries and secondaries on both sides is an even gray, fringes white, other markings as in *crispata*.

Habitat.—Newark, N. J. (Keller), 1 ♀.

Coll. Barnes.

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A KEY TO THE GENERA AND NOTES ON THE SYNONYMY OF THE TRIBE CALLIPTERINI, FAMILY *APHIDIDÆ*.

BY H. F. WILSON, U. S. BUREAU OF ENTOMOLOGY.

With a view to correcting various incorrectly used terms of this group, the author has made a careful study of American and European forms and type species. So far as he has been able to determine from the specimens studied, only a single American species can be placed in the genus *Callipterus*, which also includes but one European species, while the majority of the American forms belong to the genus *Myzocallis*. A detailed description of each type species has been given, and the synonymy was made after a study of specimens for each genus involved. It is hoped that the key for generic determination will fully cover all the known American species.

I am indebted in this paper to Prof. C. P. Gillette, of Fort Collins, Colo., who was kind enough to help me with the key for the genera.

Tribe *Callipterini*.

Antennæ six segmented, variable in length, and usually quite slender; sixth segment with a more or less variable spur, which in some species is short and stout, in others exceedingly long and slender. Beak short and thick, wings long and slender, the cubitus with two forks. Nectaries variable in size and shape, but usually short. Cauda usually globular at the tip and constricted towards the base; beneath the cauda is the anal plate, which is usually large and formed into two lobes.

All of the species in this group are marked in such a way as to give them a beautiful delicate appearance, and they are quite easily distinguished. The larvæ are covered with fine bristles, each of which arises from a minute tubercle. The sexual females have the abdomen considerably elongated, and this elongation can be pushed into crevices where the eggs are deposited.

KEY TO GENERA OF CALLIPTERINI:

1. Antennal tubercles prominent; antennæ always exceedingly long...3.
2. Antennal tubercles wanting or very small; antennæ variable in length, sometimes shorter than the body.....4.

3. Nectaries very long and large.....5.
Nectaries very short and more or less constricted at the middle...6.
Nectaries little more than pores.....10.
4. Nectaries distinct, usually being longer than broad at middle.....7.
Nectaries little more than pores and broader than long.....10.
5. Nectaries as long as one-fourth the body or more, and swollen in the middle.....*Drepanosiphum*.
Nectaries large and nearly one-fourth the length of the body, swollen at the base and tapering toward the middle.....*Drepanaphis*.
6. Spur of sixth antennal segment longer than the segment...*Calaphis*.
Spur of sixth segment not longer than segment.....*Eucraphis*.
7. Antennæ longer than the body, spur of sixth segment long and about the same length as the segment.....8.
Antennæ shorter than the body, spur very short, often being little more than a nail-like process, segment short.....9.
8. Antennæ with spur at least as long as sixth segment, and with little or no antennal tubercles. Nectaries twice as long as broad and constricted in the middle.....*Myzocallis*.
Antennæ with spur shorter than sixth segment, nectaries much broadened at base.....*Eucallipterus*.
9. Antennal spur less than one-half the length of the sixth segment, nectaries not longer than broad at base, and constricted in the middle.....*Chromaphis*.
Antennal spur at least half as long as the sixth segment, nectaries short, about as long as broad and placed on a broad base...*Callipterus*.
10. Antennæ situated on distinct tubercles and much longer than the body, nectaries but pores with raised edges, spur of sixth long and tapering...*Monaphis*.
Antennæ not on tubercles and scarcely longer than the body, nectaries reduced to pores, spur of sixth joint nearly as long as the joint.....*Monellia*.

Drepanosiphum Koch, 1855.*

type, *A. platanoides* Schrank.

Characters: Antennæ exceedingly long and placed on distinct tubercles, spur of sixth segment about six times as long as the segment, which is very short; third segment longer than the sixth and spur together. First segment large and gibbous on the inner side; antennal

*Die Pflanzenläuse Aphiden, p. 201.

tubercles elevated on the inner side, forehead flat, moderately wide. Wings long and slender, with cubitus twice forked. Nectaries one-fourth the length of the body and very robust, being enlarged at the middle and base. Cauda one-fourth the length of the nectaries, oblong and globular at the tip; base broad, tapering to a constriction at the connection with the base. Anal plate broad and slightly emarginated.

Drepanaphis Del Guercio, 1909.*

type, *D. acerifoliae* Thomas.

Syn.: *Phymatosiphum* Davis,[†] 1909.

Characters: Antennæ at least twice as long as the body and situated on distinct antennal tubercles; spur of sixth segment eight times as long as the segment; third segment shorter than spur of sixth. Antennæ very slender and tapering. Forehead convex, body robust, and bearing finger-like projections on the dorsal portion of the abdomen. Nectaries about one-fifth the length of the body, swollen at the base and tapering outwardly. Cauda one-half the length of the nectaries and globular at the tip, base broad and tapering towards the constriction between the base and the tip. Anal plate seemingly divided longitudinally and slightly emarginated in the middle.

Calaphis Walsh, 1863.†

type, *C. betulella* Walsh.

Characters: Antennæ much longer than the body, with segments 3, 4 and 5 more or less hairy, and sixth about one-half the length of the spur. Antennal tubercles large and broad, with bases almost together, giving the forehead a narrow appearance and forming with it a U. Thorax long and slender, nectaries spindle-shaped and short, being equal in length to the cauda. Cauda, thick, short and globular at the tip; base broad and about two-thirds as wide as long. Anal plates slightly emarginated, lobes rounded. Sides of abdomen with prominent tubercles, each one bearing a single hair. Wings long and slender, veins thick and dark, deflexed when at rest.

Euceraphis Walker, 1870.‡

type, *A. betulae* Linnaeus.

Characters: Antennæ about one and one-half times as long as the body, and placed on large tubercles; spur of sixth segment slender and

*Rivista di Patologia Vegetale, Vol. p. 2.

†Annals of the Entomological Society of America, Vol. 2, p. 196.

‡Proceedings of the Entomological Society of Philadelphia, Vol. 1, p. 391.

§The Zoologist, p. 2001, 1870, London.

slightly shorter than the segment. Third segment four to five times as long as the sixth and spur; first segment gibbous on the inner side. Inner side of antennal tubercles with slight projection. Forehead narrow, body long, wings long, with cubitus twice forked. Nectaries short, slightly longer than broad, and somewhat tapering, but constricted in the middle; ends oblique to the axes of the nectaries. Cauda longer than the nectaries and knobbed at the tip; base tapering and strongly constricted at junction with the tip. Anal plate rounded and without an emargination. *Callipterus mucidus* Fitch belongs in this genus.

Myzocallis Passerini, 1860.¹

type, *A. coryli* Gœtze.

Synonyms: *Pterocallis* Passerini, 1860.¹

Callipteroides Mordwilko, 1894.²

Tuberculatus Mordwilko, 1894.²

Subcallipterus Mordwilko, 1894.²

? *Therioaphis* Walker, 1870.³

Discussion: This genus was first formed in 1860 by Passerini, with *Aphis coryli* Gœtze as the type. At the same time he formed the genus *Pterocallis*, with *Aphis alni* Fabricius as the type, and included with it *Aphis tiliae* Linn.

In 1906 Schouteden formed the genus *Eucallipterus*, with *A. tiliae* Linn. as the type.

After studying specimens of the above species I am of the opinion that *A. alni* Fab. is too closely related to *Myzocallis* to form a new genus, and so *Pterocallis* is a synonym. The second species included by Pass., under the genus name *Pterocallis*, is entirely distinct from the type, and so the genus *Eucallipterus*, as formed by Schouteden with *A. tiliae* Linn. as the type, is valid.

In looking over specimens which are supposed to be *Aphis ononodis* Kaltenbach, I fail to see any characters distinct enough to separate this species from the genus *Myzocallis*, and so I have placed *Therioaphis* Walker as a questionable synonym of that genus.

In 1894 Mordwilko used *A. coryli* Gœtze as the type for his genus *Callipteroides*, but as this species was used for *Myzocallis* it must go under *Myzocallis*. In looking over specimens of *Aphis quercus* Kalt, I was

1. Gli Afidi, Parma, p. 28, 1860.

2. Raboli Laboratorie Zoologischeskago Kabineta Imperatorskago: Varshavskago Universiteta.

3. The Zoologist, p. 1999, 1870.

unable to separate this species from *Myzocallis*. Mordwilko also used *A. alni* Fab. for his genus *Subcallipterus*, but as this species is the type of *Pterocallis* then must *Subcallipterus* be a synonym.

Characters: Antennæ slightly longer than the body and without antennal tubercles, spur of sixth segment not more than twice as long as the segment. Forehead formed into a pointed projection supporting the frontal ocelli. Prothorax and body elongated, wings long but variable in width. Nectaries almost as broad as long and tapering. Cauda short globular at the tip and placed on a narrow base. Anal plate shaped like the larger part of a heart and emarginated by a median wide groove. Notes taken from American and European species. The following American species belong in this genus: *M. punctatus* Monell, *M. ulmifolii* Monell, *M. trifoliae* Monell, *M. alnifoliae* Fitch, *M. discolor* Monell, *M. genevi* Sanborn, *M. ulmicola* Thomas, *M. asclepiadis* Monell.

Eucallipterus Schouteden, 1906.*

type, *A. tilia*, Linnæus.

Characters: Antennæ slightly longer than the body, slender and tapering. Spur of sixth segment not longer than the segment; first segment not gibbous on the inner side. Front of head wide and with two frontal tubercles, one on each side of the frontal ocelli, and giving the appearance of three ocelli or tubercles, each side tubercle bears a single bristle. Body tapering, wings long and slender, with dusky markings. Nectaries short and much enlarged at the base, outer part cylindrical, ends irregular as if broken. Cauda three times the length of the nectaries, slightly constricted in the middle and globular at the tip. Base as long as globular part and slightly wider at the base. Anal plate strongly lobed, the lobes forming a regular V.

Chromaphis Walker, 1870.†

type, *A. juglandicola* Kaltenbach.

Characters: Antennæ shorter than the body and not placed on antennal tubercles, spur of sixth segment about one-eighth the length of the segment. Forehead wide, with one large tubercle in the centre and a smaller one on each side. At the inner side of the base of each antennæ the head is slightly projected. Body short and stout. Wings long and slender. Nectaries short, small, and constricted in the middle. Cauda short, globular at the tip and constricted towards the base. Anal plate

*The Zoologist, 1870, p. 2001.

shaped like the large part of a heart. The larvæ of this genus have but three-jointed antennæ.

Callipterus Koch, 1855.¹

type, *A. juglandis* Kaltenbach.

Synonyms: *Callaphis* Walker, 1870.²

Ptychodes Buckton, 1881.³

Panaphis Kirkaldy, 1904.⁴

This species was originally described by Frisch, but as that was prior to the 10th edition of Linnæus, and as Kaltenbach was the first one to describe this species after Linnæus, the species belongs to Kaltenbach.

In 1860 Passerini made this species the type of the genus *Callipterus*, and in 1870 Walker used the same species for the type of his genus *Callaphis*. In 1881 Buckton erected for this species the genus *Ptychodes*; the name being preoccupied, Kirkaldy, in 1904, suggested the name *Panaphis*.

Characters: Antennæ shorter than the body, stout, and without antennal tubercles. Forehead broadly rounded, with the inner edges projected at the base of the antennæ. Body oblong and stout; nectaries short, stout and subconical, distal edge being nearly parallel with axis of the body. Cauda twice as long as nectaries, tip elliptical, constricted into a broad base. Anal plate divided into two parts, each division forming a broad blunt tooth-shaped piece, the two being widely separated at the top and converging at the base to form a U. Wings short and broad.

Callipterus caryæfoliæ Davis is the only American representative of this genus.

Monaphis Walker, 1870.*

type, *A. antennata* Kaltenbach.

Synonym: *Bradyaphis* Mordwilko, 1894.†

This genus was made in 1870 by Walker, and was not again referred to by later writers. Mordwilko, probably never having seen Walker's paper, used the same type species to form his genus *Bradyaphis*, which must fall as a synonym of the first. So far as known at the present time, there are no representatives of this genus in North America.

1. Die Pflanzenläuse Aphiden, p. 208.

2. The Zoologist, Vol. 5, p. 2001.

3. Monograph British Aphididæ, Vol. 3, p. 39.

4. The Entomologist, Vol. 37, p. 279.

*The Zoologist, p. 2001, 1870.

†Rab. Lab. Zool. Kab. Varch. Univ., p. 46 of separate.

Characters: Antennæ longer than the body and situated on large broad tubercles; spur slender, and about twice as long as the segment; first segment broader than long and gibbous on the inner side. Forehead narrow and oblique to the sides of the antennal tubercles. Body elongated, wings long and slender; nectaries hardly more than pores with a chitinous ring around the edge. Cauda short and broadly pointed, differing from the rest of the genera by the absence of the knob at the tail-end. Anal plate short, separated in the middle and forming two distinct lobes. End of cauda and lobes hairy.

Monellia Cestlund, 1887.*

type, *A. caryæ* Fitch.

Characters: Antennæ longer than the body and without antennal tubercles; spur of the sixth segment stout, and equal to the length of the segment. Forehead raised in the middle and projected at the inner side of the base of each antennæ. Body long and tapering, nectaries but pores with a chitinous ring about the edge. Cauda short, globular at the tip and constricted into a broad base. Anal plate long and divided in the centre, forming a deep V. Wings when at rest lie in a horizontal position.

A NEW PTEROMALID PARASITIC ON *TORTRIX* *FUMIFERANA*.

BY CHARLES T. BRUES, CAMBRIDGE, MASS.

Nasonia tortricis, sp. nov.

Length, 2 mm. Moderately brilliant metallic green, with bluish reflections, which are especially noticeable on the metathorax, pleuræ and coxæ. Legs, except the coxæ and apical tarsal joint, brownish-yellow, with the femora infuscated. Scape, pedicel and ring-joints of antennæ honey-yellow, the following joints piceous. Head, seen from above, two and one-half times as broad as thick, the lateral ocelli as far from the eye-margin as from the median ocellus. Eyes bare, or very indistinctly pubescent, removed from the oral margin by half their length; malar furrow distinct, but very delicately impressed. Antennæ inserted slightly below a line drawn between the lower margins of the eyes, two-fifths as far from the oral margin as from the median ocellus; 13-jointed, with two ring-joints and a three-jointed club. Scape reaching nearly to the median ocellus; pedicel as long as the ring-joints and the first joint of the funicle together; funicular joints quadrate, becoming slightly transverse apically,

*Minn. Geol. Survey Report 4, p. 44.

the last nearly twice as broad as the first ; club oval, not much enlarged. Surface of head roughly shagreened above and on the front, more finely so behind the eyes. Clypeus slightly prolonged into a short, almost truncate lobe. Left mandible with three teeth, right one with four. Palpi light yellow. Mesonotum coarsely shagreened or finely reticulate punctate, as long as broad. Axillæ separated by their own width, more finely sculptured than the mesonotum. Scutellum very convex apically, in front finely sculptured like the axillæ, but much more coarsely so at the apex ; without cross-furrow. Metathorax with a very distinct median carina. Spiracular sulci present, but not very deep ; lateral folds very distinct at the base, but evanescent apically. Mesopleura roughly shagreened, but with a large triangular polished space above. Abdomen nearly as long as the thorax, scarcely produced below, and flat above, with the apex rather suddenly narrowed and pointed. Wings hyaline, veins weak brownish-yellow ; marginal vein three-fifths as long as the sub-marginal, long and slender, and about as long as the postmarginal ; stigmal vein slender, three-fourths as long as the marginal, with a small knob at its apex.

Male: Differs from the female by its more slender form, bright metallic green colour and paler legs. The legs, except coxæ, are pale yellow, with only the last tarsal joint blackened, and the antennæ are also pale brownish-yellow, somewhat infuscated toward the apex.

Described from two females and two males received from Dr. C. Gordon Hewitt, Dominion Entomologist, Ottawa, Canada. They were reared early in August by Mr. Arthur Gibson, of the Entomological Division, from pupæ of the spruce bud-worm, *Tortrix fumiferana*, collected at Baskatong, Quebec, where the caterpillars were feeding on spruce and balsam.

This species appears to be referable to *Nasonia* Ashm., although it will not well run to this genus in Ashmead's table. It agrees better with his characterization of *Marmoniella*, which Mr. N. W. Kourдумoff, who has seen the type in Washington, tells me is based on the same type specimen as *Nasonia*, Ashmead having given also the same manuscript name (*brevicornis*) to the type species of both genera. Since Girault has more recently (*Psyche*, June, 1910) given a full description of *Nasonia*, I prefer to use this name, although it appears on a later page of Ashmead's paper.

I had at first placed the present species in *Habrocytus* Thoms., but believe it is better placed as indicated above.

Bussey Institution, Harvard University, May 20, 1910.

NOTES ON GENUS CATONIA (HOMOPTERA).

BY E. P. VAN DUZEE, BUFFALO, N. Y.

The synoptical table of the species of this genus published by me in January, 1908, has become rather antiquated on account of the discovery of a number of new forms. The following table includes all described species from America north of Mexico:

- Apex of the head more or less angled, with the carinae sharp; the lateral carinae of the front following its basal margin and forming a distinct angle before the eye, where they join those of the vertex; eastern species.....1.
- Apex of the head tumid, with the vertex sloping and confounded with the base of the front in a common convexity, the carinae obsolete there; lateral carinae of the front following the contour of the eyes; western species.....7.
1. Face conspicuously transversely banded.....2.
Face not distinctly banded.....6.
 2. Front entirely black, the clypeus abruptly white; elytra unicolorous brown, nervures impunctate.....7, *dimidiata* VanD.
Front transversely banded with white opposite the antennae.....3.
 3. Elytra unicolorous, nervures impunctate.....6, *impunctata* Fitch.
Elytra variegated, nervures punctate.....4.
 4. Larger, 7 mm.; front distinctly narrowed at base, which is but obscurely banded.....1, *nava* Say.
Smaller, 5-6 mm.; base of the front black.....5.
 5. Front much narrower at base; vertex narrow, truncated before, its sides considerably produced before the eyes; mesonotum variegated.....2, *cinctifrons* Fitch.
Front hardly narrower at base; vertex broad, obtusely angled before, the sides not produced before the eyes; mesonotum unicolorous, castaneous.....3, *picta* VanD.
 6. Larger, 7 mm.; elytral areoles with numerous incomplete transverse veinlets; apex of the mesonotum with a pair of ocellated black points.....4, *grisea* VanD.
Smaller, 5 mm.; elytral areoles without transverse veinlets.....5, *pumila* VanD.
 7. Front banded, its basal carinae indicated; elytra fuscous, the areoles dotted and some of the transverse veins white.....8, *fusca* VanD.
Front without transverse bands.....8.

8. Colour ferruginous, inclining to castaneous; elytra with a transverse clitellate band.....12, *cara* VanD.
 Colour some shade of brown or fuscous; elytra not banded.....9.
9. Smaller, less than 5 mm; colour testaceous-brown, with the costa obscurely paler.....11, *costata* VanD.
 Larger, 6 mm.; not distinguished by a paler costa.....10.
10. Of a uniform ferruginous- or rufous-brown, sometimes marked with sanguineous on the abdomen and elytral nervures; apex of the elytra infuscated with contrasting nervures.....10, *rubella*, n. sp.
 Of a clear fuscous-brown; carinæ of the pro- and mesonotum and elytral nervures mostly whitish.....9, *nervata*. n. sp.

I have omitted from this table the West Indian *intricata* Uhler, and the Mexican and Central American species described by Fowler in the *Biologia*. Below is a list of the species of *Elidiptera* and *Catonina* known from north of Mexico and the West Indies:

Genus ELIDIPTERA Spinola.

Ann. Soc. Ent. Fr., viii, p. 304, 1839.

Helicoptera Am. & Serv., Hemipteres, p. 526, 1843.

Van Duzee, Proc. Acad. Nat. Sci. Phila., lix, p. 475, 1908.

1. COLORATA Van Duzee.—Proc. Acad. Nat. Sci. Phila., lix, p. 476, 1908.

Habitat.—N. Y. (Approaches genus *Pseudohelicoptera* Fowler.)

2. OPACA Say.—Jl. Acad. Nat. Sci. Phila., vi, p. 239, 1830; Compl. Writ., ii, p. 374, 1859.

vestita Prov.—Pet. Faun. Ent. Can., iii, p. 221, 1889.

pinorum Manee.—Ent. News, xxi, p. 117, 1910.

Habitat.—Canada to North Carolina.

3. PALLIDA Say.—Jl. Acad. Nat. Sci. Phila., vi, p. 240, 1830; Compl. Writ., ii, p. 374, 1859. Van Duzee, Proc. Acad. Nat. Sci. Phila., lix, p. 477, 1908.

Habitat.—Eastern States, Canada.

4. HENSHAWI VanD.—Trans. Am. Ent. Soc., xxxvi, p. 83, 1910.

Habitat.—Washington State.

5. SLOSSONI VanD.—Proc. Acad. Nat. Sci. Phila., lix, p. 478, 1908.

Habitat.—New Hampshire.

6. SEPTENTRIONALIS Prov.—Pet. Faun. Ent. Can., iii, p. 220, 1889.

Habitat.—Canada, New England.

7. FLORIDE Walker.—List of Homop., ii, p. 326, 1851. Van Duzee, Trans. Am. Ent. Soc., xxxvi, p. 83, 1910.

Habitat.—Rhode Island to Florida.

8. VARIEGATA VanD.—Proc. Acad. Nat. Sci. Phila., lix, p. 479, 1908.

Habitat.—Canada to North Carolina.

9. FUSIFORMIS VanD.—Trans. Am. Ent. Soc., xxxvi, p. 82, 1910.

Habitat.—California.

[NOTE.—Of the Biologia species, *Helicoptera longiceps* Fowl. appears to belong to this genus.]

Genus CATONIA Uhler.

Proc. Zool. Soc., Lond., 1895, p. 61.

Van Duzee., Proc. Acad. Nat. Sci. Phila., lix, p. 480, 1908.

1. NAVA Say.—Jl. Acad. Nat. Sci. Phila., vi, p. 238, 1830; Compl. Writ.,
ii, p. 373, 1859.

Habitat.—Eastern States.

2. CINCTIFRONS Fitch.—Third Rept., Trans. N. Y. St. Ag. Soc., 1856,
p. 451.

Habitat.—New York, Pennsylvania.

3. PICTA VanD.—Proc. Acad. Nat. Sci. Phila., lix, p. 481, 1908.

Habitat.—New Jersey to Florida.

4. GRISEA VanD.—Proc. Acad. Nat. Sci. Phila., lix, p. 482, 1908.

Habitat.—New York to Canada.

5. FUMILA VanD.—Proc. Acad. Nat. Sci. Phila., lix, p. 483, 1908.

Habitat.—New York, Ohio.

6. IMPUNCTATA Fitch.—Cat. Ins. N. Y. St. Cab., Fourth Ann. Rept., p.
46, 1851.

Lintner's 9th Rept., in 46th Rept. St. Museum, p. 386,
1893.

Van Duzee.—Proc. Acad. Nat. Sci. Phila., lix, p. 482,
1908.

Habitat.—Eastern States.

7. DIMIDIATA VanD.—Trans. Am. Ent. Soc., xxxvi, p. 85, 1910.

Habitat.—Eastern States.

8. FUSCA VanD.—Proc. Acad. Nat. Sci. Phila., lix, p. 481, 1908.

Habitat.—California.

9. NERVATA, n. sp.—(See below.)

Habitat.—California.

10. RUBELLA, n. sp.—(See below.)

Habitat.—California.

11. COSTATA VanD.—Trans. Am. Ent. Soc., xxxvi, p. 86, 1910.

Habitat.—California.

12. CARA VanD.—Trans. Am. Ent. Soc., xxxvi, p. 86, 1910.

Habitat.—California.

[NOTE.—The following *Biologia* species seem to belong to this genus: *Helicoptera sobrina* and *chiriquensis*; *Plectoderes basalis*, *excelsus*, *notatus*, *laticollis* and *fuscolineatus*, and possibly *montanus* and *asper*. Genus *Plectoderes* Spinola has the head as wide as the pronotum, which excludes all the species above mentioned.]

Descriptions of new species :

CATONIA RUBELLA, n. sp.

Form and size of *fusca* nearly. Of a uniform brown, more or less inclined to ferruginous and touched with sanguineous on the elytral nervures and abdomen. Front immaculate; apical border of the elytra fuscous crossed by pale nervures. Length, 5–6 mm.

Head more conical than in any of our other species. Vertex broad, transverse, sloping; produced in an obtuse rounded angle; base sub-angularly emarginate; carinæ nearly straight, forming a regular triangle, but little broader than long, median carina abbreviated just before the apex. Front broad, scarcely widened apically, obviously convex, carinæ prominent, but becoming obsolete on the tumid base; clypeus scarcely distinguished from the front, the sides narrowly laminate. When viewed from the side the head is produced in a blunt cone before the eye for a distance of about one-half the length of the latter, and the lateral carinæ of the front lie close to and are concentric with the anterior and superior borders of the eye. Pronotum less than half the length of the vertex, with the carinæ distinct and the hind edge deeply, angularly emarginate; mesonotal carinæ parallel and distinct. Median tooth of the male genital segment short, abrupt, ligulate and rounded at apex, and less than half the length of the plates.

Colour: Head, pronotum, face, chest and legs testaceous-brown, the eyes and tibial and tarsal spines black; mesonotum and elytra a little darker and obscurely tinged with ferruginous; elytral nervures more or less distinctly sanguineous; apex of the elytra somewhat infuscated, with the apical nervures (about seven in number) whitish or bordered with whitish. Wings quite strongly infuscated, with blackish nervures. Abdomen fuscous or black, with the genital pieces and margins of the segments testaceous or sanguineous.

Described from two male and two female examples from the Cornell University collection, taken at Felton, California, about May 22nd, 1907,

by Mr. J. C. Bradley. This species may be known by the subconical head, resembling that found in *Paracalidia* in the Jassidæ, the uniformly brown or testaceous-brown colour sometimes tinged or marked with sanguineous in places, and the pale veins on the infuscated apex of the elytra.

CATONIA NERVATA, n. sp.

Form and size of *dimidiata*, but with a shorter and broader vertex. Colour a clear fuscous-brown, elytral nervures and all carinæ, except those of the head, whitish; base of the clypeus with a whitish mark on either side. Length, $5\frac{1}{2}$ mm.

Head very short and blunt; at apex rounded in both diameters. Vertex transverse, its length scarcely one-half the width between the eyes, sloping and confused with the rounding base of the front; carinæ inconspicuous, forming a transverse compartment rounded before and a little longer at the middle than next the eye; hind edge feebly arcuated. Front broad, a little constricted between the eyes; the carinæ distinct below, obsolete on the tumid base; apex rather deeply angularly excavated to receive the clypeus; the latter longer than broad, with prominent median carinæ and narrowly expanded margins. Viewed from the side, the base of the front is but feebly, conically produced, with the lateral carinæ closely following the contour of the eyes, as in *rubella*. Pronotum shorter than the vertex, deeply angularly emarginate. Mesonotal carinæ distinct, parallel. Median tooth of the male genital segment slender and acute, over one-half the length of the plates.

Colour clear fuscous-brown, a little tinged with castaneous on the mesonotum; carinæ of the pro- and mesonotum broadly whitish, the lateral angles of the latter ivory-white. Vertex and front more testaceous-brown, an oblique mark on each side of the base of the clypeus and its apex pallid, pleural pieces broadly edged with whitish; legs pale testaceous-brown; abdomen blackish-fuscous, the slender edges of the segments and genital pieces pallid. Elytra fuscous-brown, becoming paler along the middle of each areole; nervures strong, mostly whitish, but somewhat alternated by dusky in places, the transverse and apical more conspicuously white. Wings a little infuscated at apex with dark nervures.

Described from one male taken on Mt. Wilson, near Pasadena, California, on August 10th, 1909, by Mr. Fordyce Grinnell, jr. This species is very distinct from any other known to me, and is well characterized by the clear fuscous-brown colour veined with whitish. Allied to *Plectoderes lineaticollis* Fowler, but with a shorter vertex and immaculate front.

SOME NEW WESTERN THAMNOTETTIX (HOMOPTERA).

BY E. D. BALL, EXP. STATION, LOGAN, UTAH.

Thamnotettix venditaria, n. sp.

Form and colour of *decipens* nearly. Slightly longer; green, with three large black spots in a triangle on the vertex. Length, ♀, 5.5 mm.; ♂, 4.75 mm.

Vertex bluntly angulate, with the apex slightly conically produced, twice wider than long, one-third longer on the middle than against the eye, disc slightly sloping to the rounded anterior margin, front slightly inflated, distinctly wider than in *decipens*, scarcely more than half longer than its basal width. Elytra not quite as long as in *decipens*, venation similar.

Colour: Vertex straw-yellow, with a pair of large, oval, black spots extending from behind the ocelli obliquely towards the middle of the disc. Another triangular black spot on apex usually narrowly bisected by the median line. Face pale yellow, with the sutures mostly narrowly black-lined, upper two-thirds of the front smoky, with a light median line and about six abbreviated arcs on either side. The front and vertex separated by an arcuated line. Pronotum green, the anterior margin dirty straw. Scutellum pale yellow, a pair of round black spots at the base half concealed by the pronotum. Elytra green, the nervures pale straw. Below straw-coloured, with some dusky on the abdomen and the ovipositor black.

Genitalia: Female segment nearly as long as its basal width, roundingly narrowing from the base to the truncate apex, which is narrowly marked with black. The lateral angles are semicircularly depressed, leaving an elevated median disc as wide as the black marking. Male valve very broad and short, obtusely angular; plates together, long, triangular, their margins slightly concave, and clothed with stiff hairs.

Described from two females and three males from Utah and Reno, Nevada, collected by the author. This species might easily be mistaken for a *Cicadula* in colour and marking, but is readily separated by the venation.

Thamnotettix viriosa, n. sp.

Size and form of *chiragrica* nearly. Broad, stout, powdery green, with five black spots on vertex. Length, 5.75 mm.

Vertex broad and short, nearly three times wider than long, the apex bluntly conical, disc slightly sloping, broadly rounding to the tumid front,

August, 1910

which is as wide as its median length. Pronotum broad and short, scarcely longer than vertex. Elytra broad, only slightly longer than the abdomen.

Colour: Vertex pale yellow, a pair of large, nearly quadrangular black spots on the margin just outside the ocelli, a still larger one on the apex, triangularly forking posteriorly, and two small round ones on the posterior margin equidistant from the median line and the eyes. Face pale, with the sutures black-lined, those around the loræ heavily so; a pair of black spots above the antennæ. Front smoky, set off from vertex by an arcuated black line, the median line pale, triangularly widening below, with about nine pale arcs on each side. Pronotum pale green, the anterior margin lighter, submargin sometimes with faint dusky spots. Scutellum pale powdery green. Elytra pale green, heavily powdered with white. Venation obscure.

Genitalia: Female segment as long as broad, slightly narrowing to the truncate apex; lateral margin depressed, a black line on the posterior margin, sometimes reduced to two spots. Male valve broad and short, bluntly angular, plates together, broadly triangular, their apices broadly, slightly roundly, truncate, scarcely exceeding the broad swollen pygofers.

Described from eight examples from Beaumont, California, collected by the author. A large and readily recognized species.

Thamnotettix Titusi, n. sp.

Size and form of *melanogaster* nearly. Slender, parallel, vertex right-angled. Green, with the face and tip of elytra smoky. Length, ♀, 5.5 mm.; ♂, 5 mm.

Vertex one-half wider than long, right-angled in front, the disc flat or transversely depressed, roundly angled with the front. Front much narrower than in *atridorsum*, wider and more nearly parallel margined than in *melanogaster*, distinctly longer than wide. Elytra long, narrow, inclined to be flaring at the tips, giving the insect a parallel-margined appearance. Venation simple.

Colour: Vertex pale straw, inclined to be greenish at base, and smoky or tawny at tip. The smoky front is visible from above on either side the apex of vertex, and often there are a pair of oblique spots at the base. Face pale, the front smoky, growing darker above, with numerous pale arcs. Pronotum green, rarely with dark spots on the submargin. Scutellum pale, sometimes a pair of small black spots at base. Elytra

green, the appendix and apical cells smoky, with the nervures light. Below smoky.

Genitalia: Female segment slightly longer than its basal width, roundly narrowing to half its basal width, then truncate and black-marked, curving around the long pygofers. Male valve short and broad, obtusely angled, plates together, slightly longer than their basal width, narrow and bluntly rounding at the apices, which slightly exceed the narrow pygofers.

Described from twelve examples from Colfax, California, and Medford and Grant's Pass, Oregon, those from the latter place collected by Prof. Titus, the remainder by the author. The black tip of the elytra and the angled vertex will readily separate this from any other described species. Named in honour of Prof. E. G. Titus, whose industrious collecting has brought to light many good things.

Thamnotettix vastula, n. sp.

Resembling *Titusi* in form and general appearance, slightly shorter and stouter, with distinct genitalia. Length, 5 mm.

Vertex slightly acutely angled in the female, scarcely wider than long, as long as the pronotum, about right-angled in the male; disc flat, roundly angled with the front. Front much more strongly retreating than in *Titusi*, distinctly narrowing below. Elytra broader and shorter than in the former species, and inclined to be appressed posteriorly. Venation simple, the apical cells not elongated.

Colour: Vertex pale, clear straw. Face in the female pale, the sutures and front pale, smoky, except for the pale arcs on the latter. In the male the face and venter are deep smoky, with a light spot on the clypeus. Pronotum and scutellum pale green, becoming straw-colour towards the margins, the appendix and apical cells abruptly deep smoky.

Genitalia: Female segment much narrower than the penultimate, constricted at the base, roundly narrowing towards the apex, which is narrow, slightly thickened, and a trifle excavated. The whole segment very much the shape of a blunt-tipped spoon. Male valve as in *Titusi*; plates together, slightly narrowing, and then extending into a long spatulate process between two and three times as long as wide.

Described from five examples from Chico and Salinas, California, collected by the author. The sharper pointed head and longer genitalia render this species quite distinct, and easily separated from the other members of the group.

(To be continued.)

THE ORTHOPTERA OF WESTERN CANADA.

BY THE EDITOR.

The Orthopterous fauna of Western Canada was, until a comparatively few years ago, almost unknown. Several papers, however, have appeared within recent years, which have added considerably to our knowledge of the Canadian species of this order, and during the past four years the writer has examined nearly a thousand specimens from a large number of localities in the four western Provinces, Manitoba, Saskatchewan, Alberta and British Columbia, and a good deal of light has thus been thrown upon the distribution of many species. It seems best, therefore, to bring together in a single paper all the information available on the distribution of Orthoptera in these four Provinces.

The collections examined by the writer, but not yet reported upon, were made chiefly by Prof. W. J. Alexander, of Toronto; and Messrs. N. Criddle, Aweme, Man.; T. N. Willing, Regina, Sask.; and N. B. Sanson, Banff, Alta. My thanks are due to all of these gentlemen for generous gifts of specimens or the loan of material for study, but especially to Prof. Alexander, who, although not an entomologist, devoted a large part of a two months' trip through the Canadian West to the collection of Orthoptera for the writer's cabinet, and although without any experience in collecting insects, succeeded in taking some 400 specimens, representing 40 species.

Prof. Alexander's trip was made in September and October, 1906, and his collecting was almost all done at the various stations along the Canadian Northern and Canadian Pacific Railways. As with few exceptions not more than a day was spent at any station, a list of the stations, with the dates on which the collecting was done, is given below, in order to avoid the necessity of repeating these dates in the list of species.

List of localities and dates of capture of specimens taken by Prof. Alexander in 1906:

Manitoba: Carman, Sept. 6; Swan River, Sept. 8; Elkhorn, Sept. 13; Gilbert Plains, Sept. 18; Grandview, Sept. 18.

Saskatchewan: Findlater and Condie, Sept. 10; Yellow Grass and Pasqua, Sept. 12; Moosomin, Sept. 13; Kamsack and Kuroki, Sept. 19; Langham, Radisson, Vonda and Weyburn, Sept. 20; Medicine Hat, Sept. 26.

Alberta: Vermilion, Sept. 21; Ponoka and Red Deer, Sept. 24; Calgary, Sept. 25; Lethbridge and Macleod, Sept. 27.

British Columbia: Lloydminster, Sept. 21; Cranbrook, Sept. 28; Kitchener, Sept. 29; Nelson, Sept. 30; Greenwood, Oct. 1; Savonar and Kamloops, Oct. 8; Victoria, Oct. 20.

LIST OF CHIEF REFERENCES.

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- Caudell, A. N.—Some Orthoptera taken at Moose Jaw, Assa., CAN. ENT., XXXVI, p. 248 (1904).¹
- “ The Decticinae of North America. Pr. U. S. N. M., XXXII, pp. 285-410 (1907).²
- “ Notes on some Western Orthoptera, with descriptions of new species. Pr. U. S. N. M., XXXIV, pp. 71-81 (1908).³
- Caulfield, F. B.—A sketch of Canadian Orthoptera. Rep. Ent. Soc. Ont., XVIII, pp. 59-72 (1888).
- Fletcher, James.—Rep. Exp. Farms, Can., 1888, pp. 47-77 (1889).¹
- “ Entomological Record, 1905, Rep. Ent. Soc. Ont., XXXVI, (1906).²
- “ Entomological Record, 1907, Rep. Ent. Soc. Ont., XXXVIII, (1908).³
- “ Entomological Record, 1908, Rep. Ent. Soc. Ont., XXXIX, (1909).⁴
- Rehn, J. A. G.—Records of Orthoptera from Western Canada. Ent. News, XXI, pp. 23-27 (1910).
- Scudder, S. H.—List of Orthoptera collected on a trip from Assiniboia to Cumberland. Can. Nat. Geol., VII, pp. 283-288 (1862).¹
- “ Notice of the Butterflies and Orthoptera collected by Mr. G. M. Dawson, as naturalist of the British North American Boundary Commission. Rep. Geol. Res. 49th par., App. D., pp. 341-345 (1875).²
- “ The Orthopteran Genus Hippiscus. Psyche, VI (1892).³
- “ The North American Ceuthophili. Pr. Amer. Acad. Arts Sc., XXX, pp. 17-113 (1894).⁴
- “ Revision of the Orthopteran Group Melanopli. Pr. U. S. N. M., XX, pp. 1-421 (1897).⁵
- “ The species of Circotettix, a North American genus of (Edipodinae. Psyche, IX, pp. 135-141 (1900).⁶

Walker, E. M.—Records of Orthoptera from the Canadian Northwest.
CAN. ENT., XXXVIII, pp. 55-59 (1906).

Family FORFICULIDÆ.

1. *Labia minor* (L.).

MAN.—Aweme, June 18, 1909, 1 ♂; June 28, 29, 1909, 2 ♂'s,
2 ♀'s; Sept. 11, 1909, 5 ♂'s, 2 ♀'s. (Criddle.)

Family BLATTIDÆ.

2. *Blattella germanica* (L.).

MAN.—Winnipeg, Aug. 26, 1906, 1 ♂. (Willing.)

SASK.—Moose Jaw, Sept. 17, 1901, 1 ♀ with egg sac; Medicine
Hat, Oct. 1, 1903, 1 ♂, 1 ♀; Strathcona, Nov., 1903 (nymph).
(Willing.)

ALTA.—Calgary, Dec. 30, 1904, 1 ♀; Ponoka, April 27, 1903,
1 ♀. (Willing.)

B. C.—Recorded from Agassiz. (Walker.)

3. *Nyctobora holosericea* Burm.

SASK.—Medicine Hat, June, 3, 1903, 1 ♀. (Willing.)
(Introduced.)

Family PHASMIDÆ.

4. *Diapheromera femorata* (Say).

MAN.—"Selkirk Settlements on the Red River." (Scudder.¹)*

Family ACRIDIIDÆ.

Subfamily Tetriginæ.

5. *Tetrix granulatus* (Kirby).

MAN.—Aweme, April 16, 1906; May 3, 4, 5, June 7, July 1,
1904; June 9, 1909; 24 ♂'s, 18 ♀'s. (Criddle.)

Also recorded from Winnipeg. (Walker.)

SASK.—Regina, Oct. 11, 1901; June 10, 1902; June 3, 1906;
1 ♂, 2 ♀'s; Strathcona, May 20, 1905, 1 ♀. (Willing.)

ALTA.—Calgary, May 17, 1905, 1 ♂, 2 ♀'s. (Willing.) Banff.
June 24, July 10, 1908; July 14, 1909, 2 ♂'s, 2 ♀'s. (Sanson.)

B. C.—Recorded from Vancouver (Scudder), Victoria (Fletcher¹),
Agassiz (Walker) and Field (Rehn).

*Small numerals following an authority's name refer to same numerals in the list of references.

The series from Manitoba are all long-winged and exhibit great range of colour variation. One of the specimens from Banff, a male, has the pronotal process and wings somewhat shorter than usual, but is not brachypterous

6. *Tetrix Brunneri* Bol.

ALTA.—Banff, 1 ♀, long-winged; swamp off Hot Springs Road, June 3, 1909, 1 ♂, 1 ♀. (Sanson.)

B. C.—Recorded from Field by Rehn.

7. *Tetrix acadicus* (Scudd.).

MAN.—Aweme, May 1, 3, 4, 1904, 2 ♂'s, 4 ♀'s; May 31, 1904, 1 ♂; June 25, 1907, 1 ♀. (Criddle.)

Also recorded from the Lake of the Woods District. (Scudder.²) The specimens from Aweme vary in colour, from pale clay-yellowish to dark gray.

8. *Tetrix ornatus* (Say).

MAN.—Aweme, May 1, 5, 14, 1904, 3 ♂'s, 2 ♀'s; Oct. 20, 1904, 1 ♂. (Criddle.)

SASK.—Moose Jaw, June 8, 1902, 1 ♂. (Willing.)

ALTA.—Calgary, May 5, 1905. (Willing.)

These specimens are all macropterous. They are on the whole somewhat broader between the middle legs than eastern specimens of *ornatus*, but I have specimens from Ontario which are indistinguishable from them, and considerable variability seems to exist in this regard. It may be that some, or all, of these specimens should be referred to *T. crassus* Morse, but I cannot regard them as specifically distinct from *ornatus*.

9. *Tetrix crassus* Morse.

ALTA.—Recorded by Morse from Laggan. (Journ. N. Y. Ent. Soc., VII, p. 200, 1899.)

10. *Tetrix Hancocki* Morse.

MAN.—Aweme, July 30, 1904, 1 ♂, macropterous. (Criddle.)

Also recorded from Sidney. (Walker.)

SASK.—Moosomin, 1 ♂, macropterous. (Alexander.)

Subfamily Tryxalinae.

11. *Acrolophitus hirtipes* (Say).

SASK.—Medicine Hat, Sept. 26, 1906, 2 ♀'s. (Alexander.)

ALTA.—MacLeod. (Bruner.²)

12. *Eremnus Scudderi* McNeill.

Recorded from "British America." (McNeill, Pr. Davenp. Acad. Nat. Sci., VI, 269, 1897.)

13. *Akentetus unicolor* McNeill

SASK.—Walsh, Aug. 23, 3 ♂'s, 1 ♀.

These specimens were determined by Prof. Morse, and are very interesting, inasmuch as some of them possess rudimentary accessory lateral carinae of the pronotum. In one of the males there is no trace of accessory carinae, in the female they are indicated only by the margins of the pale median dorsal band, while in the other two males they are slightly indicated, being about as distinct as the true lateral carinae. These latter specimens are not generically separable from *Amphitornus*, and the genus *Akentetus* will probably have to be reduced to a synonym of the latter.

14. *Amphitornus Coloradus* (Thom.).

Syn.—*A. bicolor* (Thom.).

MAN.—Aweme. (Fletcher.² Determinations by Scudder.)

B. C.—Vernon. (Walker.)

15. *Cordillacris cinerea* (Brun.).

MAN.—Aweme, Aug. 1, 1905, 2 ♂'s, 2 ♀'s; Aug. 25, 1905, 1 ♂ (worn). (Criddle.)

Also recorded from Aweme (Fletcher²), from specimens determined by Scudder.

16. *Phlibostroma quadrimaculatum* (Thom.).

MAN.—Aweme, Aug. 1, 1905, 2 ♀'s. (Criddle.)

SASK.—Walsh, Aug. 23, 2 ♀'s. (Willing.) Also recorded from Moose Jaw (Caudell¹), and Medicine Hat (Caudell.³).

ALTA.—Banff, below Upper Anthracite Road, Aug. 5, 1908, 2 ♀'s. (Sanson.) Also from Calgary (Caudell³), and "British America." (Bruner.²)

These specimens are much larger than examples from Pine Bluff, Wyoming.

17.—*Chlœaltis conspersa* Harr.

MAN.—Dog's Head, east shore of Lake Winnipeg. (Scudder.¹)

ALTA.—Banff, below Upper Anthracite Road, Aug. 5, 1908,
1 ♀, brachypterous. (Sanson.)

The capture of this eastern species in the Rocky Mountains was unexpected and interesting. The specimen differs in no way from eastern individuals.

18. *Chlœaltis abdominalis* (Thom.).

MAN.—Aweme, Aug. 14, 1907, 1 ♂ (rather large); Oct. 3, 4, 8, 1907, 2 ♂'s, 1 ♀. (Criddle.) Grandview, 1 ♀. (Alexander.) Also recorded from the vicinity of Carberry and Neepawa. (Walker.)

SASK.—Kuroki, 2 ♂'s, 1 ♀; Vondo, 1 ♂; Langham, 2 ♀'s; Weyburn, 1 ♂. (Alexander.) Radisson, July 29, 1907, 1 ♀; Saskatoon, Aug. 13, 1906, 1 ♀; Regina, Sept. 7, 1905, 1 ♀, Sept. 8, 1909, 1 ♀. (Willing.) Recorded from Radisson also by Rehn.

ALTA.—Mt. Inglesmaldie, Seal's Lake, 7,000 ft., Sept. 11, 1908, 1 ♀; Tunnel Flats, near Banff, Sept. 4, 1908, 1 ♀, two nymphs; Banff, below Upper Anthracite Road, Aug. 5, 1908, 1 ♀; The loop, Banff, July 23, 1909, 1 nymph. (Sanson.) Red Deer, 1 ♀; Vermilion, 1 ♀; Lethbridge, 1 ♂. (Alexander.)

The three females from Regina and Saskatoon are macrop-terous, the others all brachypterous. The specimens average smaller than those from Northern Ontario, particularly those taken by Prof. Alexander.

19. *Stenobothrus curtipennis* (Harr.).

MAN.—Elkhorn, 3 ♀'s; Gilbert Plains, 1 ♂, 1 ♀. (Alexander.) Aweme. (Criddle. Det. Scudder.) Also recorded from Winnipeg (Scudder¹), and Brandon (Walker).

SASK.—Condie, 1 ♀; Yellow Grass, 4 ♂'s, 5 ♀'s; Pasqua, 2 ♂'s, 1 ♀; Moosomin, 17 ♂'s, 11 ♀'s; Kamsack, 7 ♂'s, 8 ♀'s; Langham, 1 ♂, 3 ♀'s; Radisson, 1 ♂, 1 ♀; Weyburn, 1 ♂, 1 ♀. (Alexander.) Regina, Aug. 20, 1901, Aug. 15, 1905, Sept. 5, 13, 1909, Sept. 13, 1903, Sept. 13, 1906, 3 ♂'s, 9 ♀'s; Leduc, July 22, 1901, 1 ♀; north of Olds,

Sept. 13, 1902, 1 ♂, 1 ♀; Davidson, Aug. 21, 1907, 1 ♂, 1 ♀. Also recorded from Radisson (Rehn), and Swift Current (Walker).

ALTA.—Ponoka, 3 ♂'s, 1 ♀; Red Deer, 5 ♂'s, 5 ♀'s; Calgary, 2 ♂'s, 2 ♀'s. (Alexander.) Banff, Aug. 28, 29, 3 ♀'s; Tunnel Mt., near Banff, Oct. 3, 4, 1908, 2 ♂'s, 2 ♀'s.

B. C.—Lloydminster, 1 ♀; Greenwood, 1 ♀. (Alexander.) Also recorded from Field (Rehn), Sandon and Vernon (Walker.)

These series show the usual range of variation in colour, pattern and length of tegmina. This species appears to be by far the most abundant Orthopteran in the less dry parts of Saskatchewan and Alberta.

20. *Stenobothrus acutus* Morse.

ALTA.—Edmonton. (Fletcher.²)

21. *Platybothrus brunneus* (Thom.).

SASK.—Regina, June 5, 1903, 1 ♂. (Willing.) Also recorded from Regina by Caulfield.

ALTA.—Rundle Mt., near Banff, lower part of slope, Sept. 13, 1909, 1 ♂, 1 ♀; The Loop, Banff, Aug. 16, 1909, 1 ♀. (Sansou.)

In the male from Rundle Mountain the vertex is somewhat more obtuse than that of the Regina specimen.

22. *Gomphocerus clavatus* Thom.

Syn.—*G. clepsydrus* (Scudd.).

MAN.—Aweme, June 24, July 4, 11, 1904, 3 ♂'s, 1 ♀. (Criddle.) Also recorded from the Souris River. (Scudder.²)

SASK.—Yellow Grass, 1 ♂. (Alexander.) Rudy, July 19, 1907, 1 ♂; Regina, Aug. 2, 1903, 1 ♂; Sept. 13, 1908, 1 ♀; Radisson, July 29, 1907, 1 ♂; Walsh, Aug. 23, 1 ♀. (Willing.) Also recorded from Moose Jaw (Caudell¹), Radisson (Rehn), Waldeck and Pasqua (Walker).

ALTA.—Mt. Inglesmaldie, 6,500 ft., Sept. 11, 1908, 1 ♂; Tunnel Mt., Sept. 4, 1908, 1 ♀; Banff, July 1, Sept. 13, 24, 1909, 3 ♀'s. Also recorded from New Lunnon. (Fletcher.² Det. Scudder.)

Considerable range of variation in size and coloration is present in this series. The Manitoba and Alberta specimens

average larger than those from the semi-arid parts of Saskatchewan. The male from Mt. Inglesmaldie is one of the largest examples, and is darker coloured than those from Saskatchewan. It measures as follows: Length of body, 19; head and pronotum, 6.5; tegmina, 12; hind femora, 11.5 mm.

23. *Mecostethus lineatus* (Scudd.).

Reported from Manitoba (Scudder, Hitchc. Rep. Geol. N. H., 1, 373, 1874).

24. *Mecostethus gracilis* (Scudd.).

MAN.—Swan River, 1 ♂ (Alexander); Aweme (Fletcher. Det. Scudder). Also recorded from the Red River (Scudder¹) and Winnipeg (Walker).

SASK.—Radisson, July 29, 1907, 2 ♂'s, 1 ♀ nymph. (Willing.)

Recorded from the same locality, also by Fletcher and Rehn.

ALTA.—Edmonton, July, 1904, 1 ♂. (Willing.) Also from New Lunnon (Fletcher²).

25. *Boopedon nubilum* Say.

Reported as occurring north to the "British Line." (Bruner.¹)

26. *Stirapleura decussata* Scudd.

MAN.—Aweme, May 24, 1904, 1 ♂. (Criddle.) Also recorded from Aweme by Fletcher.¹

SASK.—Medicine Hat, May 30, 1904, 4 ♂'s, 3 ♀'s; Estevan, June 8, 1902, 2 ♂'s, 3 ♀'s; Moose Jaw, May 27, 1901, 2 ♀'s. (Willing.) Langham, 1 nymph; Medicine Hat, 4 nymphs; Condie, 2 nymphs. (Alexander.)

ALTA.—Macleod, July 8, 1904, 1 ♀; Calgary, May 17, 1905, 1 ♀. (Willing.)

27. *Ageneotettix Scudderi* (Brun.)

MAN.—Aweme, Aug. 1, 1905, 2 ♀'s; Aug. 12, 1905, 1 ♂; Sept. 15, 1907, 3 ♂'s. (Criddle.)

SASK.—Reported from Medicine Hat (Caudell²), Saskatchewan Valley (Bruner, Pr. U. S. N. M., XII, p. 64, 1890).

28. *Aulocara Elliottii* (Thom.).

B. C.—Vernon (Fletcher³).

(To be continued.)

GEOMETRID NOTES.

NEW HYDRIOMENA VARIETIES.

BY L. W. SWETT, BOSTON, MASS.

Hydriomena speciosata Pack.(a) *Agassizi*, nov. var.

Expanse, 38 mm.

Packard, in his original description (Proc. Boston Soc. Nat. Hist., XVI, p. 22, 1874), had two males of different colour and markings. The one from which most of his description was drawn was a pale pea green form, wholly different from the black margined form, which I shall call the variety, limiting the other as type. In *Agassizi* the palpi are long and slender. Fore wings: basal band black, then a whitish-green space to first line of mesial band, which is narrow, black and angulated on median vein, followed by a narrow whitish-green band and then a wide dark band or γ band, which is twice as broad as in *speciosata*, almost 3 mm. Third line broken just below costa, where it is whitish-green, then begins black on median vein, below which are two whitish-green spots. Extra discal line black and same as in *speciosata*, mesial space so narrow as to be practically absent. Beyond extradiscal line is a broad irregular greenish-white band running to inner margin; beyond this the wing is entirely black except at apex, where there is a green apical streak and two yellow-green spots at centre of outer border.

Beneath fore wings brown and yellow, the bands of above showing through, but broader than in *speciosata*, in which also the black outer border is absent.

This variety was noted by Packard in the original description in the last three lines, and again in the monograph. It is very distinct, and can be recognized by the broad mesial γ band and the black outer margin, which is pea green in *speciosata*. It is a colour variety of *speciosata*, and I shall explain its position in my revision, which I cannot complete as yet, as I have to return at once some of the types, which were kindly loaned me, and do not permit of delay. I shall explain all other varieties to follow in my revision.

Type, 1 ♂, Mendocina City, Cal., collected by A. Agassiz, and in University Museum collection, Cambridge, Mass.

Hydriomena speciosata Pack.(b) *Taylori*, nov. var.

Expands 31 mm., with the palpi long (2 mm.) and slender, head brownish-olive, as is body and thorax. Fore wings brownish-olive, with a

faint trace of white near discal spot in mesial space, and crossed by five black bands of varying width. A very faint basal black dash close to body, then first line of mesial band starts as spot on costa, and runs to median vein, where it bends towards outer margin, then inward to vein 2, and outward to inner margin. Second band broad and very irregular in its course, as is the case of most of the γ bands, particularly below costa, where it is bent outward at median vein, then inward straight to inner margin; space between all the bands olive brown. Third band very narrow and irregular, bent outward opposite discal spot, then running in scallops to inner margin. Mesial space narrow, olive brown, with shading of white around discal spot, which is black and linear where *speciosata* is green. Fourth band broken opposite discal spot, then a spot beneath which is a hair line running irregularly to inner margin, where it ends in black spot. Fifth band broad at costa and widening opposite discal spot to a patch shaded on inner side by a white line; at vein 4 the black patch narrows to a line, and makes a scollop which is very striking; below it broadens and runs to inner margin, where its width is the same as at costa. A marginal row of black dots, forming a triangular black patch near apex, and connecting with fifth band by black streak; space between 5th band and border olive brown, in *speciosata* pea green. Hind wings brown, with two smoky curved bands near outer margin; edge of wing darkened near fringe, with intervenular black dots. Beneath, fore wings dark smoky-brown, with lines above faintly showing, between each is ochre-yellow on costa. Hind wings gray-brown, with bands above showing through, fringe brown.

This pretty variety I take pleasure in naming after Rev. G. W. Taylor, from whom I first received it for identification. It is a colour variety of *speciosata*, differing in the olive brown, where *speciosata* is pea green, and in the white markings. I shall explain its position in my revision to follow.

Type, 1 ♂ (in Swett coll.), 22, VII, '08, Departure Bay, B. C., from Rev. G. W. Taylor.

Co-types, 1 ♂ (in Croker coll.), 1, VII, '09, Victoria, B. C., from A. J. Croker, and also specimens in Rev. G. W. Taylor's collection.

Hydriomena autumnalis Strom.

(b) *Crokeri*, nov. var.

Expanse. 30 mm. Palpi moderate length, head yellow, stained with reddish, as is thorax and abdomen. Fore wings very light ash, especially the mesial space, the basal and marginal being yellowish, with reddish staining.

Basal portion yellow; basal line runs at right angles from costa to median vein, then goes straight to inner margin, and is black and not very wide, slightly shaded with white; mesial band yellowish, except where the wide irregular black band runs through it. This second band, or γ band, as it is sometimes called, is notched strongly on each vein, and as it approaches inner margin increases in intensity, ending in a black blotch. The third band from body is black, and very narrow, merely a hair line, and runs from costa almost straight to median vein, then on vein 2 forms a prominent projection, whence it curves back to inner margin. This tooth on vein 2 is very peculiar, and is characteristic of this variety in that it is the only projection from the line which runs from costa to inner margin. The mesial space is very light ash, with slight yellowish staining. Discal spot, linear, black and very faint. Extradiscal line narrow, bending outward sharply from costa, then in again, forming a blunt projection opposite discal spot, then curving back to vein 3, where it forms another slight projection, then bending back to inner margin. Beyond extradiscal band the margin is yellowish, with the usual irregular broad band running through the middle; outside of this the veins are dotted with black; usual black apical streak present. Marginal dots at ends of veins in fringe, which is short and yellowish. Hind wings almost white, with traces of two irregular lines near outer margin. Beneath very light ash, with lines above faintly showing through. This is a very striking variety, and I am not positive it is not a good species. It can be easily recognized by the yellow colour and prominent projection on fore wing, vein 2, where at most all other species and varieties have an indentation. I have a female from Newfoundland which is very close to this.

Type, 1 ♀, Victoria, B. C., 1892 (not perfect), in Swett coll.

Co-type, 1 ♀, Victoria, May 22, 1909, in A. J. Croker coll.

There are also specimens from B. C. in the British Museum under *pluviata* Gn., which resembles slightly my *H. edenata*, but has shorter palpi.

Hydriomena autumnalis Strom.

(a) *PERFRACTA*, nov. var.

Expanse, 30 mm. Palpi moderate, head gray, as is thorax and abdomen; close to thorax there are two black longitudinal dashes. Fore wings greenish-gray except for mesial space, which is light ash, with reddish cloudings. Basal band black, thick, running back from costa to median vein, then waving to inner margin. Mesial band gray, with usual γ band running through in a zigzag manner, ending in dark spot at costa. Third band linear, black at costa, just below which it becomes red and runs zigzag to inner

margin. Mesial space broad, light ash as in *autumnalis*, with faint linear discal dot, but heavily stained with reddish in central portion, and the whole space somewhat shaded. Extradiscal line black, shaded with red externally. Fifth or intermarginal band as in *autumnalis*, sinuate, smoke, outer margin greenish-gray, venular spots at base of fringe. Hind wings as in *autumnalis*, with two smoky bands. Beneath lines show through faintly and a slight rose colour to mesial space. This is a very striking variety, and closely resembles *Californiata* Pack, which I believe is a local red race of *autumnalis*. It differs, however, as follows: the basal band in *Californiata* runs almost straight across to inner margin, in *perfracta* outward from costa, then in a scallop to inner margin. Mesial band of *Californiata* is reddish on each side of the second band, as is also the basal space; this is not true of *perfracta*. Third line of *perfracta* is black part way, then red to inner margin; in *Californiata* entirely black; also the mesial space is not so red, and the fifth line is shaded with red only internally in *perfracta*, and not externally also as in *Californiata*. Guenée, in his description of *pluviata* (Hist. Nat. Ins. Spec. Gen. Lepid., Vol. XI, p. 378, 1857), speaks of this variety, but does not give it a name. My specimen is a beautiful fresh one, and shows the markings clearly, and was given to me by Mr. R. F. Pearsall.

Type, 1 ♂, May 26, '06, Catskill Mts., in Swett coll.

Co-types in Mr. R. F. Pearsall's collection.

Hydriomena irata, nov. sp.

Expanse, 30-35 mm. Palpi short; head gray at base of antennæ; thorax gray, reddish-tinted; body gray, marked with black dorsally; fore wings ash gray, with red shadings; except the mesial space, which is ash gray. Next to body a slight black dash on costa, basal space ash, with a slight tinge of red; basal line black and wider than usual, running to median vein in an outward curve, thence almost straight to inner margin. Mesial band much suffused with red, so that it is difficult to see the second irregular band. Third line black and narrow, running almost straight across wing except for slight notches on the veins. Mesial space light ash, discal spot linear. Between veins 2 and 3 there seems to be a tendency for the third and extradiscal lines to unite, as the mesial band narrows there, and there are black streaks on the veins connecting the two. Extradiscal or fourth line black and irregular, connecting in most cases with third line by black dash at vein 3. Beyond extradiscal line the margin is brownish red, with the usual wavy inter-marginal band. Venular spots at base of fringe. Hind wings pale ash, with two dusky bands near outer margin. Beneath lines

of above show through faintly. This species looks very much like *Californiata*, and is confused with it in collections. It can be known by the short palpi and peculiar subdentate antennae of male, a feature which is very striking, but does not occur in female. It also has the tendency for third and fourth bands of fore wings to connect by black veins at vein 3 and 2. It appears earlier than *Californiata*. I shall show its position in my revision to follow.

Type, ♂, April 22, 1909, Victoria, B. C., in Swett coll. Type, ♀, April 22, 1909, Victoria, B. C., in Croker coll.

Co-types, 5 ♂'s, April 19–May 3, 1909, Victoria, B. C., all in Mr. Croker's collection, through whose kindness I received them for study.

Hydriomena nubilofasciata Pack.

(a) *raptata*, nov. var.

Expands 31 mm. Palpi short, with thorax brown, tufted with green. Fore wings marked same as type, and bands have same direction, but instead of the yellow with reddish shading in mesial space, as in *nubilofasciata*, the ground colour is light grass-green between the bands, which are brown. The hind wings are brown, with two smoky marginal bands. Beneath light brown, with bands showing through, between bands on costa of a yellow-ochre colour. The green ground colouring will separate this variety from any of the others; at a glance it is closer to *scalata* Warren, Nov. Zool., XI, p. 53, 1904, than any other, but lacks the pink or red of that variety.

Type, ♂, January, 1878, Sanzalito, Calif. In the University Museum collection at Cambridge, Mass. I will point out its place in my revision to follow.

Hydriomena nubilofasciata Pack.

(d) *cumulata*, nov. var.

Expands 26–28 mm. Palpi short and dark, thorax and abdomen brown. Fore wings dark smoky-brown, with the bands just visible; in one specimen, Feb. 6, 1874, shaded slightly with red. The fore wings are nearly unicolorous, brown being the general colour; the hind wings are lighter, with the characteristic two smoky bands. Beneath of a brown colour, the lines showing through at costa only.

Type, ♂, Feb. 6, 1874, Sanzalito, Cal. In the University Museum. Type, ♀, Feb. 10, 1874, Sanzalito, Cal. Coll. at Cambridge, Mass.

This variety may be recognized by the unicolorous brown wings, and the lack of any of the yellow markings of the type.

Hydriomena nubilofasciata Pack.(c) *cupidata*, nov. var.

Expands 30 mm. Palpi short. Thorax reddish-brown, with reddish tufts. Fore wings marked as in type, except that the ground colour between the smoky bands is entirely reddish. Hind wings reddish-brown, with two smoky bands. Beneath, the lines from above show through; between them the ground colour is yellow, with a red tinge. This is close to var. *scalata* Warren, of which there is a specimen from California in Packard's collection, Feb. 6, 1874, only it lacks the green and has greenish black bands. This variety can be known by the red ground colour.

Type, ♂, California. In University Museum coll., at Cambridge, Mass.

Hydriomena nubilofasciata Pack.(e) *vulnerata*, nov. var.

Expands 32 mm. Palpi short and dark. Fore wings marked as in type, only mesial band is shaded with red on either side of first and third band. Mesial space clear white; beyond the extradiscal line the wing is red to outer band, which is smoky. Hind wings slightly reddish, with two smoky bands. Beneath light brown, lines above showing through.

This is a very beautiful variety, and closely resembles *fusco-undata* of Don. It bears the same relative position to *nubilofasciata* that *fusco-undata* bears to *H. furcata* (*sordidata* Fab.). It can be told at a glance by the reddish border and white mesial space, and has the smoky marginal band of the typical *nubilofasciata*.

Type, ♂, Feb. 6, 1874, California (No. 115, Packard). In the University Museum collection at Cambridge, Mass.

Hydriomena furcata Thünb.(d) *resecta*, nov. var.

Expands 33 mm. Palpi short. Fore wings have same markings as type, only the ground colour is red, with black specklings, and the characteristic white dot between costa and inner margin of the *furcata* group appears in a white spot with slight tail. This is not always found in *furcata*, but usually occurs, and does, so far as I have seen, in only the most closely-allied species, *reflata* Grote. The markings on hind wings are slightly more pronounced than in var. *quinquefasciata* Pack., and the ground colour is reddish-brown. In one specimen of Mr. Broadwell's the wings are almost suffused with red, so as to make the bands indistinct, but in Mr. Marloff's they are not so heavily irrorated. This variety is close

to *fusco-undata* Staud., Donov. in part, and *testacea* Prout., but are differently marked, being really varieties of *quinquefasciata*, as there is some doubt in my mind of the true *furcata* Thünb. being found here. This form might be confused with var. *cupidata* of *nubilofasciata*, but the marginal band of the latter will separate them. This seems to be a Californian variety, as have not seen any from other localities.

Type, ♂, Eden Valley, Monterey Co., Cal., in Swett coll. Type, ♀, Eden Valley, Monterey Co., Cal., in Broadwell coll.

Co-type, ♂, Feb. 1, '05, Santa Clara Co., Cal., in Marloff coll.

Hydriomena furcata Thünb.

(e) *periclata*, nov. var.

Expands 30 mm. Head and thorax green and black, palpi short and dark. Fore wings smoky-black, heavily powdered with green speckles; only the mesial and fifth bands showing, the rest of the wing suffused. Hind wings dusky brown, black discal joint and two smoky bands more prominent than usual, and regular fringe very short and dusky. Beneath very deep smoke brown, only two extradiscal lines showing on fore and hind wings; discal spot very plain on hind wings. This variety is close to var. *obliterata* Prout, but differs in the almost black hind wings and style of marking. This is almost an approach to melanism, perhaps due to its late emergence.

Type ♂, Land's End, San Francisco, Cal., Oct. 10, 1909, from Mr. F. X. Williams, and in Swett coll., No. 17.

This variety may be recognized by its suffused appearance and the green speckles. It is allied to *viridata* Pack., but that variety does not have the dark suffused colour.

BOOK NOTICES.

CATALOGUE OF THE ODONATA OF NORTH AMERICA: By Richard Muttkowsky (Bull. Pub. Mus., Milw., Vol. I, No. 1, Milwaukee, Wis.).

Those who have been looking forward to the appearance of this much-needed catalogue of North American Dragon-flies will, we think, have no reason to be disappointed. It gives the impression throughout of thoroughness and accuracy.

The classification adopted is based on Handlirsch's recent work, "Die Fossilen Insekten." Four families are recognized: Agrionidæ, Ctenagrionidæ, Aeshnidæ, and Libellulidæ. The genera are intended to follow,

as nearly as possible, a natural sequence, while under these the species are arranged in alphabetical order; 494 species and subspecies, besides 27 fossil species, are listed.

Fortunately but few changes in nomenclature have been found necessary, the most important of these being the return to Kirby's use of *Agrion* and *Cænagrion* for the genera commonly known as *Calopteryx* and *Agrion* respectively. The change was well-founded, according to the decision of the Commission for the International Code of Zoological Nomenclature, to whom Kirby's reasons for the changes were submitted.

The references, among which all that are of taxonomic value appear, include also others relating to the descriptions of early stages, morphology and distribution.

In regard to types, the custody of which is given wherever possible, the author has introduced two new terms, "Allotype" and "Morphotype." The former is used to designate a type specimen of the opposite sex to which the type (holotype) of a given species belongs; while the latter is employed for the second form of a dimorphic sex, as in the dimorphic females of many *Cænagrioninæ*.

The only feature in this excellent catalogue which we would criticise is a tendency to unduly restrict the distribution of many of the species. Many species, *e. g.*, are designated "Transition" or "Carolinian," which have been recorded from well within the limits of the Canadian zone, and in many cases are characteristically boreal. These northern records should not be ignored, for frequently they do not indicate the extreme northern range of the species; the more numerous southern records being due merely to the more thorough exploration of the warmer localities.

CATALOGUE OF NEARCTIC SPIDERS: By Nathan Banks, Bull. 72, U. S. National Museum, 1910.

This is a very valuable contribution to North American arachnology. Twenty years have lapsed since Dr. Marx published his Catalogue of the described Araneæ of temperate North America (Proc. U. S. Nat. Mus., XII, 1890), and until now it has been a difficult matter indeed for the student to post himself on the many species described since that time. The present list includes 1,330 species, distributed through 270 genera. Mr. Banks's catalogue should considerably stimulate the study of our spiders.—KARL R. COOLIDGE.

Mailed August 5th, 1910.



THE JAMES FLETCHER MEMORIAL FOUNTAIN.

The Canadian Entomologist.

VOL. XLII.

LONDON, SEPTEMBER, 1910.

No. 9.

UNVEILING OF THE JAMES FLETCHER MEMORIAL FOUNTAIN.*

The unveiling of the James Fletcher Memorial Fountain took place at the Central Experimental Farm, Ottawa, on Tuesday afternoon, the 19th July, 1910, at the hour of 4.30 p.m. The ceremony was a complete success in every way. Several hundreds of people came out from the city, and some distinguished visitors from a distance were also present. The Ottawa Field Naturalists' Club, under whose auspices the Fountain was erected, was largely represented from its local membership. Official representatives from the Royal Society of Canada and the Entomological Society of Ontario were also present, and took a prominent part in the proceedings.

Before introducing the speakers, Mr. E. R. Cameron, K. C., the Chairman of the Fletcher Memorial Committee, outlined briefly the steps that led to the erection of the Fountain, instancing facts in regard to the work of the Committee, the soliciting of subscriptions and the decision, after the most careful enquiry and consideration, to place the work of the memorial in the hands of Dr. R. Tait McKenzie, of the University of Pennsylvania, Philadelphia, U. S., an artist of wide repute who has won a high place in the salons of London and Paris for his work in bronzes.

The Honourable Sydney A. Fisher, Minister of Agriculture, who unveiled the Memorial Fountain, spoke in the very highest of terms of the late Dr. Fletcher and his work for Canada. He referred to his early associations with him, and in a charming manner described how the personal friendship which began many years ago continued up to the time of his death. He said that Dr. Fletcher was one of the first, if not the very first person, to welcome him to Ottawa on his election as a Member of Parliament. He then went on to speak of his relations with him as Minister of Agriculture. Dr. Fletcher, he said, represented the ideal type of a public servant. The work which he did throughout the whole of Canada was of the greatest benefit to the country at large. Entirely forgetting himself in every way, he gave up his whole time to the work in

* From the Ottawa Naturalist, August, 1910.

which he was placed in charge, as Entomologist and Botanist of the Dominion Experimental Farms. He was a very hard worker and one who never spared himself. There was no doubt in his mind that if he (Fletcher) had taken a much-needed rest, some few years ago, he might have been with us and doing his work to-day. His investigations and lecture courses took him to every part of the Dominion, and the experience he thus gained respecting agricultural conditions was of extreme value to him in his work. His whole thought was to benefit Canadian agriculture, and the wide reputation he made, not only in his own country, but throughout practically the whole world where economic problems in agriculture are studied, will last as long as time itself. Of a genial and enthusiastic temperament, he made friends wherever he went, and his name to-day is known in every part of Canada where agriculture is practiced. His delightful personality brought him in close touch with farmers, horticulturists and others, and his talks and lectures on insects and plants were always eagerly listened to.

Dr. Bethune, Professor of Entomology at the Ontario Agricultural College, Guelph, expressed his gratification at seeing so many young people present to do honour to the memory of the late Dr. Fletcher, who was so deeply interested in children of all ages and so ready at all times to help and instruct them. He said that he came as a representative of the Ontario Agricultural College, where Dr. Fletcher was always a most welcome visitor. Whenever it was announced that he was to give an address at the College, the hall was sure to be thronged with both young men and women who were eager to hear him. He also represented the Entomological Society of Ontario, of which Dr. Fletcher had been a very active member for a great number of years. On the appointment of Dr. Saunders to be director of the Experimental Farms he was obliged to give up his active co-operation in the work of the Society, and happily his place was very satisfactorily filled by our lamented friend. For nearly thirty years he was a member of the Council of the Society and did a very great deal to advance its interests in various directions.

The speaker then went on to describe his own intimate friendship with Dr. Fletcher and his admiration for his ability as an entomologist, and in other respects as well. While we could not regard him as a man prominent for discoveries in science, while we did not exalt him to the same position as a Darwin, a Huxley or an Agassiz, still he had a very scientific capacity for discerning minute distinctions in the objects of his study, and with his wonderfully retentive memory was able to do a great

deal of most valuable work. We do not, therefore, erect this memorial as a tribute to his scientific attainments, but rather as a token of our love for the man himself and the devoted affection in which we all held him. While he was widely known and respected all over the country, and was regretted as a true friend of a great variety of people, there was another side to his character which was not so generally known: he had a very deep sense of religion and was a man of unobtrusive piety which only revealed itself to those who were on the most intimate terms with him.

Dr. Bethune then read a letter from Dr. L. O. Howard, Chief of the Bureau of Entomology, Washington, and therefore considered to be at the head of the entomologists of North America. He wrote as follows: "I regret more than I can tell that I am unable to come to Ottawa for the unveiling of the memorial. Dr. Fletcher was one of my dearest friends and I had the greatest admiration for him. His services to Canada were very great. He had a wonderful capacity in a very broad field in entomology, and was one of the best-informed men of his time on the intricate and manifold aspects of economic entomology. His reports were sound and practical, and as a public speaker before assemblages of farmers and gardeners he was unexcelled. He was known and admired, and loved also, throughout the United States. In fact, I have never known a man who had so many absolutely devoted friends as Dr. Fletcher. His energy, his enthusiasm, his absorbing interest in everything that lives and grows, his warm heart, his perfect lack of even a suspicion of egotism, attracted everyone who knew him and bound them to him in friendship, and even love, forever."

Dr. Wm. Saunders, C. M. G., Director of the Dominion Experimental Farms, spoke very feelingly of his long association with Dr. Fletcher, which commenced before his appointment on the staff of the Experimental Farms. The value of his work as Entomologist and Botanist to the farmers of the Dominion was very great, and he has been much missed. At meetings of farmers and fruit-growers his clear statements regarding subjects under discussion made his presence a great benefit. He was blessed with a childlike optimism and cheerfulness of spirit which made his society always welcome, and instances of his wide and kind sympathy can be recalled by all who had the privilege of his acquaintance. Dr. Saunders said he had hoped to enjoy his co-operation in the work of the Experimental Farms as long as he held the office of Director. An all-wise Providence decreed otherwise, however; but although deprived

of his society and help, he would always look back to the pleasant intercourse of the years they spent together. Such a life as his was will be a lasting influence for good. Having by this memorial striven to show our appreciation of our late friend's character and work, we may honour him still further by endeavoring to maintain and advance those sciences to the promotion of which so much of his life was so enthusiastically devoted.

Dr. W. D. LeSueur, Hon. Secretary of the Royal Society, in paying his tribute to the late Dr. Fletcher, said that the ceremony in which we are engaging to-day, the duty we are fulfilling towards the memory of our departed and deeply-lamented friend, is one in which the Royal Society of Canada may very fittingly take a part. It was early in the history of the Society—at its third annual meeting in the year 1885—that the name of James Fletcher was enrolled in its list of members. His zeal and his attainments as a practical botanist and entomologist had already attracted the attention of the leading men of Section IV., the Section devoted to the biological sciences; and they gave him a warm welcome to their ranks. It is almost needless to add that he did not regard his election in the light of an idle decoration; he saw in it rather a call to work and duty, and he took at once an active part in the labours of his Section, of which nine years later he was elected President. The address which he delivered in that capacity dealt with the subject of practical entomology. The turn of his mind was at all times practical. He was one of those men who see things to do, and who do them. He was not a man to undervalue or depreciate scientific theory, but his talent lay rather in the region of the visible and tangible. The living, breathing world was his domain. He had the quick eye, the retentive memory, and, above all, the responsive, sympathetic heart.

In the year 1901 we find him reading a paper before the Society on "The Value of Nature-Study in Education." This was a subject after his own heart. He could not understand education apart from nature-study.

His executive abilities were quickly recognized, and for many years he filled most efficiently the office of Honorary Treasurer. In the year 1906, he succeeded Dr. S. E. Dawson, then elected vice-president, in the more difficult and laborious office of Honorary Secretary. Here his talents of industry, tact and management found abundant exercise. The office had previously been held but by two individuals, Sir John Bourinot for the first twenty years of the Society's existence (1882-1902), and Dr.

Dawson for the four succeeding years. These were the distinguished predecessors in whose steps he had to walk ; and it was agreed by all that, in his hands, the best traditions of the office were fully maintained. He worked while it was day faithfully and well. Feeling testimony is borne to his services and character in the Proceedings of the Royal Society of Canada of last year ; and in the galaxy of noble men whom that Society has lost, the name of James Fletcher shines, and will shine, with a radiance all its own.

Mr. R. B. Whyte spoke on behalf of the Ottawa Field-Naturalists' Club. He told of the early days in the history of the society and of the keen interest which Dr. Fletcher, who had been worthily styled its "father," always had in its welfare. When the Club was organized in 1879, about 40 gentlemen joined its ranks, largely through Dr. Fletcher's influence. No one at that time ever expected the Club to develop in the remarkable way it has done and to do the great amount of work it has since accomplished. From that year until his death, during which period the membership has increased to over 300, he was at all times the chief mainstay, so to speak, of its varied branches of work. As a field-naturalist, there was probably no one in America who was his equal. He had a deep love for boys and girls, and many well-known naturalists in Canada to-day owe their early interest in plants and animals to him. At the excursions of the Club he was always the leading centre of attraction. Everyone wanted to go with Dr. Fletcher through the woods and into the meadows and get from him some of his enthusiasm and knowledge about the forms of life which occurred everywhere.

Mr. Frank T. Shutt, Chief Chemist of the Dominion Experimental Farms, said that to those who knew James Fletcher personally no monument in stone or bronze is needed to keep his memory green. The charm of the true, kindly, cultured gentleman which we all felt when in his company will not readily be forgotten. But we have done well in the erection of this Fountain, a tribute to his memory—a tribute, as has been happily expressed upon the stone, of affection from his friends, that may speak to those who come after of the love and the admiration we had for him ; to tell them that James Fletcher was a man who did much good in his day and generation. His work was of incalculable benefit to the farmer and fruit-grower of this country in combating weed, fungus and injurious insect. Probably of even more value, however, was his inspiring enthusiasm, that power to awaken in others an interest in the study of animate

nature. And in this connection we of Ottawa were particularly fortunate. Whether on the excursions of the Field-Naturalists' Club or on the lecture platform of the winter series of lectures, he was the teacher that all listened to with pleasure. We do honour to-day to the memory of a busy man called away in the prime of his life, in the midst of his work. So far as we know he had made no startling or brilliant discovery in the realm of pure science, but that fact—if fact it be—does not in the least detract from the honour that is rightly his. We are rather apt nowadays to save our applause for those who legitimately or illegitimately can startle us. But Dr. Fletcher was none such. He was a hard worker—but one who looked upon his work as his pleasure—and he was a phenomenal success in that special work to which he devoted his life. He left us a splendid example; may we all try in some measure to follow in his footsteps.

We may all take great satisfaction in knowing that this Fountain, now entrusted to the care of the Experimental Farm and the public, has been erected as a free-will offering by his admirers. In not a single instance was personal canvassing resorted to. We shall rejoice to reflect in the days that are to come that this memorial was the spontaneous tribute of those who knew and loved James Fletcher.

The following letter from Dr. T. J. W. Burgess, Medical Superintendent of the Protestant Hospital for the Insane, Montreal, was read by Mr. Shutt:

"I cannot tell you how sorry I am to be obliged to say that I shall not be able to be present to do honour to dear old James Fletcher. No more lovable man ever breathed. It is one of my proudest boasts that, for over thirty years, I was counted by him on his list of friends. Never had science a more ardent votary than the late Dr. Fletcher. His whole thought was given to it, and not only his personal intimates, but Canada as a whole, should cherish the memory of one who offered up his entire time and energy to her service, making for himself thereby a fame that it will be difficult for anyone to eclipse. As Longfellow says:

'His heart was in his work and the heart
Giveth grace unto every Art.'

Peace to his ashes!

'He rests from his labours, and his works do follow him.' "

FIRST INTERNATIONAL CONGRESS OF ENTOMOLOGY,
BRUSSELS, 1ST TO 6TH AUGUST.

Canada was represented at the above Congress by Mr. Henry H. Lyman, of Montreal, who was present at some of the concluding sessions and at the banquet. The United States had three representatives, Dr. W. J. Holland, Mr. Herbert Osborn and Dr. Henry Skinner. We have just received from Mr. Lyman a copy of the resolutions on Nomenclature which were adopted by the Congress, to be forwarded to the Eighth International Congress of Zoology, which is to be held at Graz, Austria, immediately after the Congress of Entomology.

We publish these resolutions in the original French, and are sure that our readers will be glad to see them at the earliest possible moment.

Ier CONGRES
INTERNATIONAL D'ENTOMOLOGIE.

Bruxelles, 1—6 Août, 1910.

SECTION DE NOMENCLATURE.

1°.—Il est désirable que les règles internationales de la nomenclature zoologique soient suivies également par l'entomologie pour autant qu'elles répondent aux nécessités de cette science.

2°.—Il est désirable que les descriptions soient, autant que possible, accompagnées par des figures.

3°.—Les noms des auteurs doivent être écrits, autant que possible, en entier. Le Comité de nomenclature entomologique est chargé de dresser, pour le prochain congrès, une liste des abréviations des noms d'auteurs.

4°.—Les descriptions qui ne sont publiées que dans les catalogues des marchands et dans les journaux politiques sont à rejeter (sans effet rétroactif).

5°.—Le Comité de nomenclature entomologique est chargé de préparer, pour le prochain congrès une liste des noms de genres, espèces et variétés, dont il est désirable de corriger l'orthographe.

6°.—Il est hautement désirable que les publications entomologiques portent la date précise de leur publication. Le Comité international permanent est chargé de faire connaître cette résolution du Congrès à tous les rédacteurs et éditeurs de publications entomologiques.

7°.—L'Entomologie adopte la loi de priorité sans exception pour les noms de genres, d'espèces et de variétés. Le point de départ de la nomenclature est la Xme édition du "Systema Naturæ" de Linné (1758).

8°.—La section de nomenclature du Ier Congrès international d'Entomologie considère comme étant de la plus grande importance qu'une disposition nouvelle soit ajoutée aux règles internationales de la nomenclature zoologique, à moins que,* lors de la description d'une espèce ou d'une variété nouvelle, un exemplaire seulement soit étiqueté comme "type," les autres exemplaires examinés en même temps par l'auteur, comme "cotypes."

TRANSLATION OF ABOVE.

FIRST INTERNATIONAL
CONGRESS OF ENTOMOLOGY,
Brussels, 1-6 Aug., 1910.

NOMENCLATURE SECTION.

I.—It is desirable that the international rules of zoological nomenclature be followed equally by entomology as far as they are adapted to the requirements of this science.

II.—It is desirable that descriptions be, as far as possible, accompanied by figures.

III.—The names of authors ought to be written, as far as possible, in full. The Committee on Entomological Nomenclature is instructed to draw up, for the next Congress, a list of abbreviations of authors' names.

IV.—Descriptions which are published only in dealers' catalogues and in newspapers are to be disregarded (without retroactive effect).

V.—The Committee on Entomological Nomenclature is instructed to prepare, for the next Congress, a list of names of genera, species and varieties, whose orthography it is desirable to correct.

VI.—It is highly desirable that entomological publications bear the exact date of their publication. The permanent international committee is instructed to make known this resolution of the Congress to all the publishers and editors of entomological publications.

VII.—Entomology adopts the law of priority, without exception, for the names of genera, species and varieties. The starting point of nomenclature is the 10th edition of "*Systema Naturæ*" of Linnæus (1758).

VIII.—The nomenclature section of the first International Congress of Entomology considers as being of the greatest importance, that a new clause be added to the international rules of zoological nomenclature, providing that, at the time of description of a new species or new variety, one example only should be labelled as "type," the other examples examined by the author at the same time as "co-types."

* There seems to be an error here. The English translation, which follows, gives the meaning which the sentence was apparently intended to convey.

THE ORTHOPTERA OF WESTERN CANADA.

BY THE EDITOR.

(Continued from page 276.)

Since the first part of the present paper appeared, Mr. Caudell has kindly called my attention to the omission from the list of references of his paper, "Notes on some Orthoptera from British Columbia" (Ent. News, 1904, pp. 62, 63). From this paper, which will be cited as "Caudell¹," the only additional records to be made to those already published in the present list are the following from Kaslo, B. C.: *Blattella germanica*, *Tetrix granulatus*, *T. Brunneri* and *T. crassus*.

Subfamily *Cedipodinae*.

29. *Arphia frigida* (Scudd.).

MAN.—Aweme, June 21, 1903, 1 ♀, yellow-winged. (Fletcher.)

SASK.—(a) Yellow-winged (*frigida*): Saskatoon, June 1, 1906,

1 ♀. (Willing.) (b) Red-winged (*arcta*): Alameda, May 30,

1901, 1 ♂; July 5, 1902, 1 ♀. Battleford, July 7, 1907.

Estevan, July 8, 1902, 2 ♀'s. Ft. Qu'Appelle, June 17, 1901,

1 ♂; Medicine Hat, May 30, 1904, 3 ♂'s, 5 ♀'s; Oct. 1,

1903, 1 ♀ nymph. Oxboro', May 29, 1901, 1 ♂, 1 ♀.

Radisson, June 30, 1907, 1 ♀; July 29, 1907, 1 ♀. Regina,

May 31, 1909, 1 ♂; June 20, 1903, 1 ♀; July 5, 1903, 1 ♀.

Saltcoats, July 12 and 13, 1902, 1 ♂, 1 ♀. Saskatoon, June

20, 1902, 2 ♂'s, 1 ♀. (Willing.) Also recorded from Wood

End (Scudder²), * Rudy (Fletcher³ and Rehn), and Radisson (Rehn).

ALTA.—(a) Yellow-winged: Banff, back of Tunnel Mt., July 1,

1908, 1 ♂, 1 ♀. The Race-track, Banff July 1, 1909, 1 ♂.

Also 2 ♂'s, 3 ♀'s from Banff without dates. (Sanson.)

(b) Red-winged: Banff, back of Tunnel Mt., June 25, 1908,

1 ♀. Also 3 ♂'s, 2 ♀'s from Banff without dates. (Sanson.)

Nymphs: Banff, May 28, 1908, 3 spec.; July 21, 1909, 1 spec.

Also recorded from Banff as *A. teporata* (Fletcher³).

In the large series from Saskatchewan the wings vary from yellow, through deep orange to deep vermilion. The red colour is only rarely as deep a shade as in *A. pseudonietana*. The yellow sutural stripe of the tegmina is present in only three

*Small numerals following an authority's name refer to same numerals in the list of references.

examples in this series, though present in all the Banff specimens. Great variation in general coloration, distinctness of spots of tegmina, etc., are observable in the series.

30. *Arphia pseudonietana* (Thomas).

MAN.—Aweme, Aug. 30, 1907, 1 ♀; Sept. 15, 1907, 1 ♀. (Criddle.) Also recorded from the Souris River (Scudder²), Brandon, the vicinity of Souris and Boissevain, and between Carberry and Neepawa (Walker).

SASK.—Medicine Hat, Oct. 1, 1903, 1 ♂ (Willing); 1 ♂, 2 ♀'s, 1 nymph (Alexander). Moose Jaw, Sept. 28, 1906, 1 ♀. Regina, Sept. 17, 1909, 1 ♂; Sept. 13, 1908, 1 ♀. Swift Current, Sept. 17, 1 ♀. Walsh, Aug. 23, 1901, 6 ♂'s, 6 ♀'s. (Willing.) Yellow Grass, 3 ♂'s, 1 ♀. (Alexander.) Also recorded from Regina (Caulfield), Moose Jaw (Caudell^{1, 2}, Walker), Medicine Hat (Caudell²), Herbert, Gull Lake and Maple Creek (Walker).

ALTA.—Banff, back of Tunnel Mt., Oct. 3, 1908, 1 young ♀ nymph. (Sanson.) Also recorded from Calgary. (Caudell²)

B. C.—Recorded from Vernon (Fletcher², Walker), Victoria (Fletcher¹, Walker), Vancouver (Saussure, Prod. CEd., 68, 1884).

31. *Chortophaga viridifasciata* (DeGeer).

SASK.—Maple Creek, July 12, 1907, 1 green ♀. (Willing.) Also recorded from Moose Jaw. (Caudell¹)

The extensive variation characteristic of this species is well shown in the series.

32. *Encoptolophus parvus* Scudd.

MAN.—Aweme, Sept. 6, 1907, 1 ♂; Sept. 14, 1909, 1 ♀. (Criddle.)

SASK.—Pasqua, 1 ♀. Yellow Grass, 1 ♀. (Alexander.) Walsh, Aug. 23, 1901, 4 ♂'s, 12 ♀'s. Regina, Sept. 19, 1903, 1 ♀; Sept. 13, 1908, 1 ♀. (Willing.) Also recorded from Moose Jaw (Caudell^{1, 2}), and from near Waldeck, Swift Current and Pasqua (Walker).

Both of the Manitoba specimens, two of the females from Walsh and the two from Regina are green, the others brown.

33. *Camnula pellucida* (Scudd.).

MAN.—Aweme, July 27, 1903, 1 ♂; Aug. 12, 1905, 1 ♂. (Criddle.) Deloraine, June 15, 1899, 1 ♀. (Fletcher.) Also recorded from Portage la Prairie, Plum Coulee and Brandon. (Walker.)

SASK.—Regina, Aug. 29, 1909, 1 ♀; Aug. 31, 1901, 1 ♂, 1 ♀; Sept. 5, 1909, 1 ♀; Sept. 19, 1903, 1 ♂; Sept. 23, 1906, 1 ♀. Walsh, Aug. 23, 1901, 1 ♂. (Willing.) Also recorded from Indian Head (Walker), and Radisson (Rehn).

ALTA.—Ponoka, 1 ♂. (Alexander.) Edmonton, July, 1904. (Willing.) Banff, Aug. 16, 1909. (Sanson.) Also recorded from Macleod (Bruner, Bull. Div. Ent. U. S. Dept. Agr., 11, 15, 1883); Canmore and Kananaskis (Walker), and Calgary (Caudell²).

B. C.—Nelson, 1 ♂, 1 ♀. Victoria, 2 ♀'s. (Alexander.) Vernon, July 26, 1895, 1 ♂, 1 ♀. (Fletcher.) Also recorded from Discovery Bay, Vancouver Id. (Walker), Kaslo (Caudell⁴), and Beavermouth (Rehn).

34. *Hippiscus tuberculatus* (Pal. de B.).

MAN.—Aweme, June 16, 1904, 1 ♂; July 1, 1909, 1 ♂. (Criddle.) Also recorded from Dufferin (Scudder²), and the Red River (Scudder³).

SASK.—Alameda, May 30, 1901, 1 ♀. Billings' Mill, July 12, 1903, 1 ♀. Boucher, first half of July. (Courbeaux.) Regina, Sept., 1 ♂ nymph. Tacomba, April 30, 1903, 1 ♂ nymph. Also two females without locality. Also recorded from Kinistino. (Rehn.)

ALTA.—Red Deer, 11 nymphs. (Alexander.) Also recorded from Calgary. (Scudder³)

As compared with female specimens from Southern Ontario, those from Saskatchewan are distinctly larger, the tegmina measuring from 31.5 to 36.5 mm., the hind femora 19 to 21.5 mm., while in Ontario specimens the tegmina vary from 28 to 32.5 mm., and the hind femora from 18.7 to 19.5 mm. The spots of the tegmina are better defined, the fuscous band of the wings darker, and the disk of the latter vermilion instead of a dull rose-red.

35. *Hippiscus neglectus* (Thomas).

MAN.—Aweme, July 14, 1904, 2 ♀'s. (Criddle.) Also recorded from the same locality by Rehn.

ALTA.—Macleod. (Scudder³)

B. C.—Nelson, 1 ♀. (Alexander.)

36. *Hippiscus obscurus* Scudd.

B. C.—Recorded from this Province by Scudder³ and from Vernon, as *H. Californicus*, Walker.

The specimens from Vernon exhibit two types of coloration. In one the markings are distinct, as in *H. neglectus*, in the other they are obscured with brown and the tegmina are without the yellow sutural stripe. As these specimens show no structural differences and were all taken together, there can hardly be a doubt that they belong to the same species. The distinctly-marked individuals are scarcely separable from *H. neglectus*, and I doubt very much if they are specifically, or even racially, distinct from that species.

37. *Hippiscus zapotecus* Saussure.

MAN.—Aweme, July 10, 1907, 1 ♀. (Criddle.) Also recorded from Mill Valley. (Walker.)

SASK.—Rudy. (Rehn.)

38. *Hippiscus tigrinus* Scudd.

MAN.—Aweme, June 24, 1909, 1 male; June 2, 3, 1904, 2 females (determined by Scudder). Also recorded from the same locality by Fletcher.²

SASK.—Dubuc, May 30, 1907, 1 ♂. Indian Head, July 22, 1903, 1 ♀ (yellow-winged); April, 1905, 1 ♂ nymph. Maple Creek, Aug. 2, 1902, 1 ♀ (yellow-winged). Medicine Hat, May, 30, 1901, 1 ♀ (red-winged); May 30, 1904, 2 ♂'s, 2 ♀'s (yellow-winged), 2 ♂'s, 1 ♀ (red-winged). Meota, July 8, 1906, 1 ♂, 1 ♀. Pincher, June 24, 1902, 1 ♀ (yellow-winged). Radisson, July 20, 1907. Regina, Aug. 11, 1904, 1 ♀ (reg-winged). North of Swift Current, May, 1907 (col. Dr. Charlton), 1 ♀ (red-winged). East of Weyburn, June 19, 1901, 1 ♀ (red winged).

I have included under *H. tigrinus* many specimens which do not agree with Scudder's description in all respects. In fact, I find it impossible to separate *H. latefasciatus*, *tigrinus* and *zapotecus* by the characters given by Scudder. The course of the intercalary vein, the development of the tubercles of the pronotum, the width of the fuscous band of the wings and the extent of the maculation of the tegmina are all very variable characters. As, however, I have seen but few authentically determined specimens of these three forms, I make as yet no

positive statements as to their status, but I believe that time and extensive collecting will show them all to belong to one and the same species.

The wings in the Saskatchewan series are either sulphur-yellow or rose-red, no intergrades having been seen.

39. *Hippiscus latefasciatus* Scudd.

MAN.—Aweme, June 19, 1903, 1 ♀. Also recorded from this locality by Rehn and Fletcher,² and from the Red River by Scudder.³

ALTA.—Calgary, May, 1907, 1 ♂. (Sanson.) Also recorded from this locality by Scudder.³

40. *Dissosteira Carolina* (L.).

MAN.—Aweme. (Criddle.)

SASK.—Walsh, Aug. 23, 1901, 2 ♂'s, 2 ♀'s. Medicine Hat, Oct. 1, 1903, 1 ♀. Regina, Oct. 5, 1901, 1 ♀. (Willing.)

B. C.—Recorded from Vernon by Walker and Vancouver Id. by Caudell.²

The Saskatchewan specimens are of larger size than most of those from Ontario.

41. *Spharagemon collare* (Scudd.).

MAN.—Aweme, July 2, 1904, 1 ♂. (Criddle.) July 15, 1904, 1 ♀. (Willing.) Also recorded from Brandon and the vicinity of Souris and Boissevain by Walker.

SASK.—Boucher, July, 1896. (Courbeaux.) Weyburn, 1 ♂. Yellow Grass, 1 ♂. (Alexander.) Also recorded from Chaplin, Moose Jaw, Morse, Parkbeg and Rush Lake by Walker, and Regina by Caulfield.

ALTA.—Macleod, 1 ♂, 2 ♀'s.

This species varies very much in the height of the pronotum and in coloration. The male from Aweme is nearly uniform reddish-brown, with the tegmina indistinctly banded, the general appearance recalling *S. Bolli*. Of the two females from Macleod, one is rusty-brown, the other colored and rather short-winged.

42. *Spharagemon æquale* (Say).

SASK.—Walsh, Aug. 23, 1901, 1 ♂. Medicine Hat, Oct. 1, 1903, 2 ♂'s. (Willing.) 1 ♂, 1 ♀. (Alexander.) Recorded from Medicine Hat also by Caudell.²

ALTA.—Calgary. (Caudell.²)

B. C.—Kamloops, 1 ♀. (Alexander.)

43. *Spharagemon Bolli* Scudd.

MAN.—Aweme, July 27, 1904, 1 ♀, moderate sized. (Criddle.)

Also recorded from the same locality by Fletcher.²

44. *Metator pardalinum* (Sauss.).

SASK.—Regina, Sept. 19, 1903, 1 ♂ (yellow-winged). Walsh, Aug. 23, 1901, 1 ♂, 1 ♀ (yellow-winged), 1 ♂, 1 ♀ (red-winged). (Willing.) Also recorded from near Waldeck by Walker.

ALTA.—Macleod, 1 ♀ (yellow-winged). (Alexander.)

45. *Trachyrhachis Kiowa* (Thom.).

MAN.—Aweme, Aug. 24, 1904, 1 ♂. (Criddle.) Also recorded from the vicinity of Souris and Boissevain and near Brandon by Walker.

SASK.—Medicine Hat, 1 ♂, 1 ♀. Yellow Grass, 1 ♀. (Alexander.) Walsh, Aug. 23, 1901, 2 ♂'s, 2 ♀'s. (Willing.) Also recorded from Indian Head, Moose Jaw and Morse by Walker, and Moose Jaw by Caudell.^{1, 2}

ALTA.—Calgary. (Caudell.²)

46. *Conozoa wallula* (Scudd.).

B. C.—Kamloops, 2 ♂'s, 2 ♀'s. (Alexander.) Also recorded from Vernon by Scudder.

The specimens from Kamloops are distinctly smaller than those from Vernon, but are otherwise identical.

47. *Trimerotropis caruleipes* Bruner.

B. C.—Recorded from Nanaimo, Duncan's and Discovery Id., Vancouver Id., by Walker, and Wellington and Nanaimo by Caudell.²

48. *Trimerotropis agrestis* McNeill.

MAN.—Aweme, Aug. 14, 1900, 1 ♀; Sept. 3, 1903, 1 ♂, 1 ♀; Sept. 15, 1907, 1 ♀. (Criddle.) Also recorded from the same locality by Fletcher.³

49. *Trimerotropis citrina* Scudd.

MAN.—Scudder (Bull. U. S. Geol. Surv. Terr., II, 265, 1876).

ALTA.—Calgary. (Caudell.²)

B. C.—Vernon. (Fletcher.²)

50. *Trimerotropis Bruneri* McNeill.

SASK.—Medicine Hat, 2 ♂'s. (Alexander.) Swift Current, Aug. 5, 1901, 1 ♀; Sept., 1 ♂. (Willing.) Also previously recorded from Swift Current by Walker.

51. *Trimerotropis monticola* Saussure.

SASK.—Findlater, 1 ♂. Medicine Hat, 1 ♂. Weyburn, 1 ♂. Yellow Grass, 2 ♀'s. (Alexander.) Pincher, July 28, 1901, 1 ♀. Swift Current, Aug. 5, 1901, 1 ♂, 1 ♀. (Willing.) Also recorded from Gull Lake, Moose Jaw, Morse and near Waldeck by Walker, and Radisson by Rehn.

ALTA.—Macleod, 2 ♀'s. (Alexander.) Also recorded from Calgary by Caudell.²

B. C.—Vernon. (Walker.)

52. *Trimerotropis latifasciata* Scudd.

ALTA.—Macleod, 1 ♀. (Alexander.)

Mr. Caudell and the writer compared together the specimens of *T. latifasciata* and *T. laticincta* Sauss., in the U. S. National Museum, and found no constant distinctive characters. The latter name must fall under the synonymy of the former.

53. *Trimerotropis vinculata* Scudd.

B. C.—Ashcroft, June 15, 1905, 2 ♂'s, 1 ♀; June 5, 1 ♂. (Rev. W. M. Roger.) Savonar, 2 ♂'s. Greenwood, 1 ♂. Kamloops, 3 ♂'s. (Alexander.) Also recorded from Revelstoke, Vernon and Agassiz by Walker, and Victoria by Fletcher.³

Two of the Kamloops specimens are much smaller than the others.

54. *Trimerotropis vinculata similis* (Scudder).

ALTA.—Calgary. (Caudell.²)

55. *Trimerotropis longicornis* Walk.

B. C.—Vernon. (Walker.)

56. *Trimerotropis sordida* Walk.

SASK.—Walsh, Aug. 23, 1901, 1 ♀. (Willing.) Also recorded from Morse, Moose Jaw and near Waldeck by Walker.

57. *Trimerotropis* ? sp.

B. C.—Kamloops, 1 female. (Alexander.)

This is a peculiar specimen, having the median carina of the pronotum and the colour pattern like *Spharagemon æquale*,

but with the small head and general proportions of a *Trimerotropis*. It was submitted to Mr. Caudell, who expressed his belief that it was a *Trimerotropis*, but found it unlike any species in the U. S. National Museum. It seems not impossible that it is a hybrid between some species of *Trimerotropis* and *S. æquale*, which was also taken at Kamloops by Prof. Alexander.

58. *Circotettix verruculatus* (Kirby).

MAN.—Recorded from Dufferin by Scudder,² and Winnipeg by Scudder.¹

ALTA.—Banff, Aug. 6, 12, 1909, 2 ♀'s; Sept. 4, 1908, 1 ♂. (Sansou.)

B. C.—Vancouver. (Scudder, Appal., VIII, 308, 1898) Kaslo (Caudell⁴).

59. *Circotettix suffusus* (Scudder).

B. C.—Cranbrook, 8 ♂'s, 3 ♀'s. Greenwood, 1 ♂, 1 ♀. Kamloops, 1 ♂. Kitchener, 2 ♂'s. Nelson, 4 ♂'s, 2 ♀'s. (Alexander.) Also recorded from Donald, Revelstoke, Rossland, Robson, Vernon, Agassiz, Discovery Id. by Walker, Kaslo by Caudell⁴, and Beaver mouth and Field by Rehn.

60. *Circotettix undulatus* (Thomas).

MAN.—Aweme, Sept 1, 1907, 1 ♂. (Criddle.)

SASK.—Cowley, July 29, 1901, 1 female. Medicine Hat, Oct. 1, 1903, 1 female. (Willing.)

B. C.—Victoria. (Fletcher¹.)

61. *Circotettix lobatus* Sauss.

B. C.—Vernon. (Walker.)

62. *Circotettix carlinianus* (Thomas).

SASK.—Maple Creek, Aug. 2, 1902, 1 female. (Willing.) Also recorded from Pasqua by Walker.

ALTA.—Macleod. (Bruner, Bull. Div. Ent. U. S. Dep. Agr., II, 13, 1883).

B. C.—Vancouver Id. (Scudder.⁶)

63. *Hadrotettix trifasciatus* (Say).

SASK.—Medicine Hat, Oct. 1, 1903, 1 female. (Willing.) Also recorded from Wood End. (Scudder.²)

(To be continued.)

SOME NEW WESTERN THAMNOTETTIX (HOMOPTERA).

BY E. D. BALL, EXP. STATION, LOGAN, UTAH.

(Continued from p. 268.)

Thamnotettix vespertina, n. sp.

Resembling *vastula*, slightly stouter. Smaller, narrower and darker than *atridorsum*. Green, with a faint smoky tip to elytra. Length, 5 mm.

Vertex slightly obtusely angulate, not quite twice wider than long, almost as long as the pronotum. Disc slightly convex, anterior margin broadly rounding to the front. Front as wide as long, distinctly narrowing below. Elytra broad and moderately short, appressed posteriorly.

Colour: Vertex straw-colour, with traces of smoky at the apex and on the reflex portion of front. Face and below deep smoky, with irregular areas on clypeus, and genæ paler and short arc on the front light. The genital segments in both sexes straw-coloured. Pronotum and elytra green, the apical cells of the latter slightly smoky.

Genitalia: Female segment two-thirds as long as its basal width, almost semicircularly rounding from the base to the slightly roundly emarginate, smoky and elevated apex. Male valve very large, obtusely triangular, plates together, half wider than long, slightly roundly, narrowing to the broad blunt, almost truncate apices, which scarcely equal in length the extraordinarily broad pygofers.

Described from two females and two males from Beaumont, California, collected by the author. The dark face and narrower head, as well as the distinct genitalia, will separate this species from *atridorsum*, while its blunt head will separate it from the preceding species.

Thamnotettix visalia, n. sp.

Resembling *vastula*, somewhat larger and with a slightly shorter vertex. Green, with a trace of smoky on the apical cells. Length, 5.5 mm.

Vertex right angled, half wider than long, disc slightly convex, acutely angled with front, the margins bluntly rounding. Front slightly wider than in *vastula*, distinctly longer than wide. Elytra moderately long.

Colour: Vertex straw-yellow, face and below pale yellow. Pronotum, except the anterior margin, green. Scutellum greenish-yellow. Elytra green, becoming subhyaline beyond the middle and slightly smoky at the apex.

Genitalia: Female segment as long as its basal width, scarcely narrowed posteriorly, the median fourth of posterior margin almost

truncately excavated to one-half the depth of the segment and black-marked at the base. The lateral flaps obliquely truncate from the slightly rounding lateral angle. Male valve obtusely triangular, plates together moderately broad, triangularly narrowing to the blunt tips.

Described from three females from Chino and one pair from Visalia, California, collected by the author. Readily separated from the related species by the very distinct female genitalia.

Thamnotettix atridorsum, var. *vetula*, n. var.

Size and form of *atridorsum* nearly. Slightly shorter and stouter. Pale creamy-yellow above and below, eyes and a small spot on the female segment black. Length, 4.75 mm.

Described from five females from Kelso, California, and one from American Fork, Utah, all collected by the author. This is apparently an adaptation to a very hot, dry condition, and may prove to be a good species when further material is found. It would hardly be advisable to separate it on a single sex, however.

Thamnotettix atridorsum, var. *vesca*, n. var.

Form and colour of *atridorsum* nearly, except that it is smaller and much shorter and stouter, with the elytra scarcely covering the apex of the abdomen, the apical cells abbreviated, broader than long. Green, with the vertex and face pale straw-yellow. Length, 4 mm.

Described from four females and one male from Coronado Beach, Long Beach and Redondo Beach, California, collected by the author. These specimens were all taken along the seashore, on the short vegetation growing just above tide-water, and apparently become adapted to this rigorous condition by reduction in size and especially in wing-length.

Thamnotettix Titusi, var. *vivata*, n. var.

Form and general appearance of *Titusi* nearly, much smaller, shorter and with less markings on the face. The head is slightly broader than in *Titusi*, and the front is broader and fuller. The face is pale and slightly smoky, but never dark as in that species. The elytra are darker at the base, inclined to be bluish, and are slightly smoky at the apex, with the veins usually distinct. In two specimens the veins are light coloured throughout, the pronotum is light margined all around, and there is a transverse smoky marking on the disc of the vertex. Length, 4.5 mm.

Described from eight examples from Tia Juana, Pasadena and Riverside, California, and Reno, Nevada, all collected by the author. This

will very likely prove to be a distinct species when sufficient material is at hand, but with the small amount of widely-scattered material available at present it was thought best to refer it to *Titusi* as a variety.

Thamnotettix gloriosa, n. sp.

Form of *visalia* nearly, larger, longer, golden iridescent-green, with long flaring elytra, slightly smoky tipped. Length, 6 mm.

Vertex slightly obtusely angulate, a little over half wider than long, rounding over to the rather flat, strongly-retreating face. Front slightly longer than in *visalia*, the margins curving in to the clypeus. Elytra very long, inclined to be flaring posteriorly, giving the whole insect a long, parallel margined appearance.

Colour: Vertex straw-yellow, inclined to be tinged with orange in the males; face pale creamy-yellow in the female, lemon-yellow with the genæ lighter in the male, a black dot just outside the loræ. Pronotum a yellowish-green, darker on the disc. Scutellum pale yellowish-green. Elytra yellowish-green on the clavus, corium subhyaline-yellow, with the tawny tergum showing through, giving a golden tinge to the whole elytra, the tip inclined to be smoky-iridescent. Below pale.

Genitalia: Female segment not quite as long as its basal width, the lateral margins parallel, posterior margin with the median third angularly excavated half-way to the base, the excavation slightly narrowing towards the bottom and usually with a slight median projection, the base of the segment below the excavation gibbous, and shining black in colour. Male valve wide, the median half produced into a large triangle, plates rectangular, together almost twice wider than long, transversely convex, their apices curved upward and slightly produced at the suture, apical margins thick and with a subapical row of bristles. Extending slightly below the plates a pair of stout, black hooks are visible. Described from eight examples from Tia Juana, California, collected by the author. Specimens varying slightly in the genitalia of both sexes are at hand from Salinas and Ontario, California.

Thamnotettix gemella, n. sp.

Form and general appearance of *languida* nearly, but much smaller and lacking the black spots. A slender green species, with the margins smoky. Length, female 5 mm.; male 4 mm.

Vertex very obtusely angled, one-fourth longer on middle than against an eye, one-half as long as the basal width, disc convex, broadly

rounding to the flat and strongly-oblique face. Front narrow at base one-half longer than wide. Elytra moderately long, closely folded behind.

Colour: Vertex, face and scutellum creamy-yellow, a black point just outside the loræ. Pronotum and most of the claval areas green. The outer margin of claval areas and the inner half of corium smoky-brown, the costal margin subhyaline.

Genitalia: Female segment slightly wider than long, posterior margin concave, with the lateral angles rounding. Male valve short, bluntly produced, plates together long, acutely triangular, half longer than their basal width, their attenuate apices clothed with numerous long hairs.

Described from ten examples from Ontario, Pasadena and Tia Juana, California, collected by the author. In life there is a metallic-iridescence which heightens the striped appearance of this distinctly-marked species.

Thamnotettix generosa, n. sp.

Size and form of *gemella* nearly, the vertex more pointed. Resembling *gloriosa* in colour. Length, female 5 mm.; male 4 mm.

Vertex right angled, the apex acute, about half wider than long, disc transversely convex, sloping to the slightly rounding margin of the face. Face strongly receding, the apex of vertex and face distinctly conical. Front narrow, wedge-shaped, the margins straight. Elytra long, appressed.

Colour: Vertex and face pale lemon-yellow, a pair of black dots outside the loræ. Pronotum yellowish-green. Elytra pale yellowish-green, shading out to subhyaline towards the costa and apical cells. Some of the males are inclined to be smoky-iridescent, while one female is all pale lemon-yellow.

Genitalia: Female segment two-thirds as long as its basal width, the posterior margin gently convex, the lateral angles broadly rounded. Male valve obtusely angular, plates long, slender, together slightly concavely attenuate, over half longer than their basal width.

Described from ten examples from Colfax and Visalia, California, collected by the author.

Thamnotettix gerula, n. sp.

Form of *generosa* nearly, but larger, as large as *longula*. Greenish-yellow, with a black band covering all the elytra before the appendix. Length, 6 mm.

Vertex slightly obtusely angled, the margins straight, less than one-half wider than long, disc slightly convex. Face flat, acutely angled with

the vertex, the margin bluntly rounding, the apex nearly acute. Front wedge-shaped, less than half longer than wide. Elytra long, closely appressed behind.

Colour: Vertex and face pale lemon-yellow, a black spot outside the loræ on either side. Pronotum green, the margins pale yellow. Scutellum pale yellow. Elytra deep brownish-black back to the apex of clavus, then green to just before the apical cells, which are smoky-subhyaline. The whole elytra iridescent. Legs and below pale.

Genitalia: Female segments two-thirds as long as its basal width, gradually narrowing from the base to two-thirds its width. Posterior margin with the median half shallowly angularly excavated and strongly black-marked, the lateral angles rounding. Male valve short, very obtusely triangular, plates together triangular, longer than the basal width, the lateral margins rounding, a black line at the base on either side.

Described from eight examples from Colfax, California, and Medford, Oregon, collected by the author. The broad black saddle in sharp contrast to the yellow-green renders this a strikingly distinct species.

Thamnotettix vapida, n. sp.

Size and form of *infuscata* nearly. A large mottled-brown species with the vertex lighter. Length, female 6 mm.; male 5.75 mm.

Vertex broad, obtusely angulate, apparently almost rounding, with the apex produced, but slightly longer on the middle than against the eye, nearly twice wider than long, scarcely the length of the pronotum. Front broad, flat, retreating, wedge-shaped, union with vertex narrowly rounding. Elytra long, oftentimes flaring, venation simple, often one or two extra nervures from the outer anteapical cell to the costa.

Colour: Vertex straw-yellow, a pair of oblique dashes at the apex, a pair of round spots at base and sometimes a line from the ocelli to the middle of the disc brown. Face pale, the sutures brown, the front smoky with pale curved arcs, the upper bounding pair visible from above on the vertex margin. Pronotum pale, all but the anterior margin finely sprinkled with milky and rusty brown. Elytra milky subhyaline, finely and irregularly irrorate with rusty brown.

Genitalia: Female segment as long as its basal width, narrowing from the base, the posterior margin slightly rounding, with the median half angularly emarginate, the emargination one-half as deep as its width. Male valve transverse, scarcely angled; plates together triangular, scarcely as long as the basal width, gibbous at base, then narrowing to the blunt

spoon-shaped tip. Pygofer enlarged, broader than the plates at base, regularly narrowing to the truncate apex, which considerably exceeds the plates.

Described from ten examples from Tia Juana, Mexico, and Tia Juana, California, collected by the author. This species introduces a new group into this genus as found in America.

Thamnotettix dissimilata, n. sp.

Form of *vapida* nearly, but still longer and more strongly built. Females entirely tawny or mottled-brown; males green, with the head tawny. Length, 7-8 mm.

Vertex as in *vapida* nearly, obtusely angled, with the disc depressed, slightly shorter than the pronotum. Front broad, wedge-shaped, rounding to the clypeus, vertex margin as in *vapida*, almost acute. Elytra broad, much longer than the abdomen, costal margin nearly straight, apical cells only moderately long, usually several supernumerary veinlets from the outer anteapical cells to the costa.

Colour: Female: vertex, pronotum and scutellum pale yellow, often washed with tawny, sometimes with traces of markings on vertex, as in *vapida*, and often with brown mottlings on disc of pronotum. Face light rusty-brown or tawny, the front smoky above with light arcs. Below pale tawny. Elytra milky subhyaline, heavily irrorate with brown or tawny-brown; sometimes the brown is almost solid, and in that case the apical veinlets are light. Male: vertex dirty-yellow, washed or marked with tawny. Face darker than in female, legs and below black. Pronotum green, the anterior margin pale or tawny. Elytra deep green, fading out towards the costa and abruptly terminated just before the apical cells, which are deep smoky.

Genitalia: Female segment two-thirds as long as its basal width, narrowing posteriorly, the posterior margin shallowly, angularly excavated more than half its width, with the angles dark-marked. Male valve broad, short, scarcely angled, plates together rather narrow, roundly narrowing to the rounding apex, two-thirds as long as their basal width. Pygofer broad, inflated, then slightly narrowing to the truncate tips, which extend beyond the plates.

Described from ten specimens from Colfax, California, collected by the author. The large size and difference in colour of the sexes renders this a strikingly distinct species.

Thamnotettix gutturosa, n. sp.

Resembling *dissimilata* female in general appearance, stouter and shorter. Brown, with a short head and numerous supernumerary veinlets on the elytra. Length, male, 6 mm.

Vertex broad, short, almost parallel margined, the apex a trifle advanced, twice wider than long, disc almost flat, the margins broadly rounding to the moderately convex, slightly inclined face. Front slightly produced, as wide or wider across antennæ than at base, then narrowing to the broad truncate apex. Pronotum broad and short, but little longer than the vertex. Elytra broad, inclined to be flaring, veins distinct, venation apparently regular, strong, with a number of supernumerary transverse veinlets along the claval suture and in the anteapical and basal portion of apical cells. In both of these examples a veinlet forms "the second cross nervure," although slightly variable in position.

Colour: Vertex pale yellow, washed with testaceous, traces of a pair of round spots at base and a transverse crescent on the disc. A black spot against either eye in line with the ocelli, a dash beneath each ocellus and another on apex black; these latter being parts of a reflex frontal arc. Face rusty or tawny brown, with frontal arcs and sutures darker, a pair of dark spots above the antennæ. Pronotum cinereous. Elytra cinereous, inclined to be smoky, the veins light, heavily margined with fuscous, especially in the supernumerary cells, which are sometimes entirely fuscous.

Genitalia: Male valve obtusely roundly triangular; plates large, leathery, roundly narrowing, one-third their length, then nearly parallel margined to the broad truncate tips, longer than their basal width and entirely concealing the pygofer, their lower surface sparsely clothed with hairs.

Described from two males from Beaumont, California, collected by the author.

Thamnotettix ursina, n. sp.

Resembling *dissimilata* female in general form and colour, smaller and slightly darker, sexes alike in colour. Length 6 mm.

Vertex definitely obtusely angled, twice wider than long, the disc depressed, the margin broadly rounding to face. Front moderately wide, regularly narrowing to the truncate apex, one-third longer than its basal width. Pronotum longer than the vertex. Elytra long, almost parallel margined, the apical cells rather short. Venation regular, with the outer apical cell rather short and unusually broad. Usually a number of supernumerary veinlets to costa and occasionally a forked apical.

Colour: Vertex tawny, with a darker dash either side the apex in the male. Face rusty brown, the front smoky with light arcs. Pronotum brown or cinereous-brown, the anterior margin lighter. Elytra rich brown, sparsely irrorate with milky white dots, the nervures towards the apex lighter.

Genitalia: Female segment one-half as long as its basal width, the lateral margins slightly narrowing, the posterior margin truncate or very slightly sinuate, the median half dark-marked. Male valve obtusely triangular, plates together triangular, regularly narrowing to the almost truncate tips, concealing the pygofer, but beyond which a pair of sickle-like black hooks extend.

Described from a single pair from Medford, Oregon, collected by the author.

Thamnotettix glomerosa, n. sp.

Resembling *bullata*, but smaller and more slender, with irregular fuscous markings. Length, female, 4.75 mm.

Vertex including the reflexed portion of the swollen front as broad as in *bullata* and much longer, nearly twice as long on middle as against the eye. Vertex without a definite margin, merging into the front, which is broad and much inflated, its margins nearly parallel until just before the apex where they abruptly round in, the apex tumid, broader than clypeus and elevated above the level of the latter. Elytra moderately long, slightly flaring, venation regular, the outer anteapicals usually curved and a few extra veinlets along the claval suture.

Colour: Vertex dirty straw, a black spot against either eye, behind the ocellus, a pair of oblique dashes behind the apex and another pair of obscure ones just in front of the basal angle, fuscous. Face dirty straw, the sutures, a spot above the antennal socket on either side, and about five short arcs across the most produced part of front, fuscous. Pronotum and scutellum cinereous, irregularly mottled with fuscous, the elytra pale cinereous, with the veins lighter and slightly fuscous lined.

Genitalia: Female segment short, truncate posteriorly with the lateral angles slightly produced or with the posterior margin slightly concavely excavated according to the curvature.

Described from two females collected by the author at Grand Junction, Colorado. One example is almost lacking in the fuscous markings.

Thamnotettix gladiola, n. sp.

Size and form of *longiseta* nearly. Yellowish green with the vertex tinged with orange. Length 4.5 mm.

Vertex broad, rounding, almost parallel margined, very slightly longer on middle than against the eye, twice wider than long, evenly rounding to the moderately sloping face. Face moderately broad, not inflated, margins straight to just before the apex, one-half longer than its basal width. Elytra moderately long, slightly exceeding the abdomen. Venation regular, the outer anteapical cell variable, rarely not complete.

Colour: Vertex bright lemon yellow, often with an orange tinge. Face yellow, the front tinged with orange, a black spot just outside the loræ. Pronotum pale orange yellow, an arcuated green line on anterior disc. Scutellum lemon yellow. Elytra yellowish green, subhyaline, allowing the black markings on tergum to show through. Tergum and venter often black lined.

Genitalia: Female segment two-thirds as long as its basal width, posterior margin deeply, triangularly emarginate, the emargination starting at the acute lateral angles and extending to one-half the depth of the segment at the truncate apex, where it is one-fifth the width of the segment. Male valve short, obtusely rounding, plates together attenuately triangular, almost twice as long as their basal width, the margins heavily fringed with long hairs which almost conceal two long sword-like black points which extend beyond the plates.

Described from six examples from Dutch George's North Park, and Lizard Head, Colorado, all collected by the author.

Thamnotettix umbratica, n. sp.

Form and colour of *cyperacea* nearly, much smaller and with a longer vertex. Pale straw with black dots on the vertex margin and three pale brown stripes on vertex and pronotum. Length, female, 4.5 mm.; male, 4 mm.

Vertex right angled, longer than its basal width, twice as long on middle as against the eye, disc flat, acutely angled with front, the margin slightly rounding. Front narrow, wedge-shaped, nearly twice longer than wide. Pronotum about equalling the vertex in length, elytra moderately long, slightly exceeding the abdomen, flaring. Venation regular, distinct.

Colour: Vertex straw yellow, usually the ocelli and a dot at apex black, a brown median stripe and sometimes a pair of lateral stripes next the eyes black. Sometimes all these markings are obscure. Face pale

straw, sometimes a pair of black spots above the antennæ, another pair below and some smoky arcs on front. The usual black dot outside the loræ. Pronotum straw colour, usually with a double median brown stripe and a pair of lateral ones. Elytra straw colour, with the veins light in the female, pale smoky iridescent in the male.

Genitalia: Female segment about half as long as its basal width, truncate posteriorly or slightly emarginate with a faint median production according to the curvature. Male valve triangular, plates together transversely roof-shaped, short, rounding, scarcely as long as their basal width, their apices slightly apart, exposing their pygofer and a dark style-like process.

Described from five examples from Tia Juana, Chino, Pasadena and Stanford, California, all collected by the author.

SOME INSECTS FROM STEAMBOAT SPRINGS, COLORADO—I.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Steamboat Springs is only about 85 miles from Boulder, as the crow flies. It is, however, far on the western side of the range, in a region, hitherto little known to entomologists, because only quite recently accessible by rail. It is situated in a fertile valley, at an altitude of 6,680 feet, and is evidently destined to become a place of considerable importance. I recently spent a day (May 27) collecting there, and present herewith the principal results, not only on account of the general interest they seem to possess, but also in the hope of encouraging the beginnings of scientific activity among the young people of the locality. Most attention was naturally given to the bees.

HYMENOPTERA APOIDEA (Anthophoridæ and Megachilidæ).

Emphoropsis Johnsoni Ckll.—A dead male, being dragged along by an ant.

Osmia permorata, n. sp.—Female. Length about 14 mm., robust, dark green, with the legs entirely black; hair of head and thorax above very bright rich fox-red; of first abdominal segment above, and scantily on middle of second, rather paler red; elsewhere, including scopa, the hair is black except some reddish on inner side of anterior tarsi. I had confused this handsome species with *O. novomexicana* Ckll., which it superficially resembles. It is, however, easily separated by the dullish area of meta-thorax, without any pit; the same part in *novomexicana* is smooth and

shining, with a very conspicuous median pit. The third antennal joint is longer than in *novomexicana*, the marginal cell is longer and more pointed apically, and the outer t. c. is not angulate about the middle. The abdomen is broader and more globose than in *novomexicana*, and is dark green. The mesothorax is olive green. The bright red thoracic hair and green mesothorax will separate this from Cresson's *O. longula* and *juxta*; *O. longula* has the same kind of metathorax, however. The clypeus is black, produced and broadly truncate; the apical tooth of mandibles is very long and sharp, the mandibles are tridentate. *O. florissanticola* Ckll. is also related; it has the area of metathorax shining, but without a well-defined pit; the abdomen is very blue.

The maxillary blade in *O. permorata* is conspicuously obliquely striate and speckled with black, and the tongue is shorter than in *O. novomexicana*. In *O. florissanticola* the maxillary blade is dark.

Hab.—Steamboat Springs, Colorado (type locality), May 27, at flowers of *Physaria acutifolia* Rydb. (*Cockerell*); Johnson Park, New Mexico, July 4, at flowers of loco weed (*Anna Gohrman*). I am much indebted to Mr. S. A. Rohwer for notes on my type of *O. novomexicana*, which is in the National Museum.

Osmia fulgida Cress.—One female.

Osmia globosiformis, n. sp.—One male. Length about $7\frac{1}{2}$ mm., entirely black, except that the hind margins of the abdominal segments are very narrowly rufescent; similar to *O. globosa* (cf. *Psyche*, 1907, p. 16), but the pubescence entirely white, not in the least ochreous, except on inner side of tarsi, where it is light yellowish, and the hind basitarsus with a tooth a little beyond the middle; antennæ, long, entirely black, third joint a trifle shorter than fourth; eyes black, cheeks broad, mesothorax densely punctured, only in the middle of the disc a little more sparsely; tegulæ fuscopiceous; wings stained with reddish; b. n. just falling short of t. m.; first r. n. at end more distant from base of second s. m. than second from apex; sixth dorsal abdominal segment faintly emarginate; seventh bidentate, the teeth very obtuse; second ventral emarginate. This can hardly be the male of *O. abjecta*, on account of the dull, closely-punctured mesothorax, the entirely dull granular area of metathorax, etc.

Osmia nigrifrons Cress.—One female. This is identical with the "*nigrifrons* var." of the Boulder County table. It may prove to be a distinct species when the male is known,

Osmia atriventris Cress., var. a.—Two males.

Osmia amala Ckll.—One male. The hind margins of the abdominal segments in this example are not violaceous (cf. Can. Ent., 1909, p. 131); a better character to separate the species from *O. integrella* is the long, dense, conspicuous fringe in the deep but narrow emargination of the third ventral segment; in *integrella* the fringe is short and inconspicuous.

Osmia pseudamala, n. sp.—One male. Length nearly 10 mm., superficially similar to *O. amala*, but very different in details of structure; head and thorax olive green, pleura and mesothorax blue-green; hair thick and long, faintly tinged with ochreous above, some long black hairs on cheeks anteriorly, but none on head or thorax above, or on pleura; mandibles bidentate, the teeth of equal length (in *O. vallicola* the apical tooth is very long); flagellum 4 mm. long, rather thick, obscure reddish beneath, not moniliform (it is moniliform in *O. physariae*, *chlorops*, etc.); much longer than in *O. mertensiae*; tegulae with at least the anterior half green; wings ordinary, b. n. going just basad of t. m.; legs more or less metallic, their hair partly black and partly white; second and third joints of middle tarsi ordinary (not globose or swollen as in *O. integrella*, etc.); hind tibia thick, with a slender base; hind spurs not at all hooked at end; abdomen shining greenish-blue, the hind margins concolorous; second segment with some black hair, subapically, following segments with much coarse black hair; sixth without evident light hair, but a brush of white hair on middle of seventh, conspicuous in lateral view; sixth segment with a deep semicircular emargination; seventh bidentate, the teeth short, and more or less concealed by hair; venter strongly blue; first segment entire; third with a deep wide emargination, fringed with pale yellowish hair, the fringe long at sides, but even, without any long falciform portion such as is found in *O. seneciophila* and *brevis*. The hind basitarsus is not toothed (it is toothed in *O. Wheeleri*, *cnena*, *aprilina*, *Pasadenae* and *olivacea*).

Osmia cutrichosa, n. sp.—One male. Length about 8½ mm.; dark bluish-green, the abdomen shining, the whole insect unusually hairy, the hair dull white, faintly ochreous dorsally, *no black anywhere*; legs black with light hair, the hind femora faintly submetallic; antennae ordinary, flagellum truncate at apex, more or less stained with ferruginous beneath; tegulae green in front; wings normal, b. n. meeting t. m.; middle tarsi normal, very hairy; claw-joints ferruginous; hind basitarsus unarmed;

abdomen rather indistinctly subfasciate, apical margins of segments coloured like the rest of the surface; sixth segment with a very small notch; seventh bidentate, the teeth short and broad; genitalia nearly as in *O. inurbana*, which belongs to a different group; third ventral segment formed and fringed nearly as in *O. pseudamala*. The abdomen has only piliferous punctures. Easily known from *O. Ramaleyi* by the longer, yellowish-tinted hair on the apical half of the abdomen. The female doubtless has a light scopa.

SOME HULST TYPES OF GEOMETRIDÆ AT WASHINGTON.

BY RICHARD F. PEARSALL, BROOKLYN, N.Y.

A recent visit to the U. S. Nat. Museum, at Washington, for the purpose of studying types of this family, contained in its collections, disclosed some facts which it seems advisable to record. The following were deposited by Dr. Hulst:

Tephroclystis niveifascia.—Type No. 3920 is the specimen recorded by him as coming from Oregon. It bears the label "Keebele, Oregon," only, and is not conspecific with the one in the Hulst collection at New Brunswick, which, in a former paper, I have already stated, finds its place under the genus *Nasusina* Pears., and will now constitute the type of the species. Among material submitted to me some time ago, and returned to the Museum at this time, I had described as new a single specimen, under the name, *Eup. segregata*, n. sp., which seems to be the same as the Oregon type, and I have therefore transferred the name to it, Dr. Dyar having generously permitted me to retain as a co type the second specimen of *segregata*, a description of which will be found in a forthcoming paper.

Tephroclystis plumbaria.—Type No. 4701 is a fine female example of *Eup. miserulata* Grote, labelled Washington, D. C., July 5th.

Tephroclystis plenoscripta.—Type 4702 is the true type recorded from Yellowstone Park, Wyoming. A specimen from the same locality is in the Hulst collection at the Brooklyn Institute Museum. The latter represents the usual appearance of specimens, the type being an unusually clear, distinctly-marked example.

Tephroclystis flebilis.—Type No. 4920, recorded from Alaska, is a silky-gray species, with the same general appearance as *bivittata* Hulst,

but having the subterminal white line heavy and clear, and the veins sparingly black-scaled in central field.

Tephroclystis perfusca.—Type No. 3919 is the specimen referred to in his description, as coming from Utah (June), and must carry the name henceforth. The other type specimen from Easton, Oregon, now in the Hulst collection at New Brunswick, besides being not of the same species, is excluded by a previous writer, Mr. Geo. W. Taylor (CAN. ENT., Vol. XL, page 58), and his dictum must prevail, according to the rules. It is fortunate that he chose this species, for Dr. Hulst's description was evidently drawn from it, and fits exactly. Last year I received from Mr. Tom Spalding nine specimens like it, taken at Provo, Utah, all in good condition, as is the type. The wings are large and thin, with very indefinite markings, powdered with dusky atoms; and the inference which Mr. Taylor drew from its appearance, that it was beyond recognition, because "not in the best condition," as he puts it, is quite a mistake. All of my specimens are fresh, and resemble it exactly. His arbitrary selection of a common species from the Northwest, as representing *perfusca*, because of the imperfect condition of both types, as he states, is altogether unwarranted in view of the ease with which the real species can be determined, once we have the material at hand. I have deposited one of my specimens with the type in confirmation of my statements.

Tephroclystis acutipennis.—Type No. 3954 is a good representative, and even rubbed examples are easily identified by the broad brown lines bordering central field within and outwardly, at inner margin, running toward apex to centre of wing.

Selidosema lachrymosum.—Type from Los Angeles Co., Calif., is the female of *Hulstina Packardaria* Hulst, which was described from four males. *S. homopteroides* Hulst, type a female, is already correctly placed by Dr. Dyar in his "List" as a synonym of *lachrymosum*.

THE EDITOR will be glad to receive for publication short notes on the capture or occurrence of rare or otherwise interesting insects, particularly from Canadian localities. Details of habitat, manner and circumstances of capture, etc., will be appreciated, and such information will be acceptable, even when relating to captures, the bare records of which have already been published.

BUTTERFLY NOTES.

BY KARL R. COOLIDGE, HEREFORD, ARIZONA.

Euchloe lanceolata australis Grinnell.—Egg: Colour, when first laid, light whitish-green, but changing to orange and pale vermilion in several days' time; just before the larva makes its exit the colour is dirty brownish-yellow, particularly about the micropylar area; fusiform marked laterally with about sixteen raised vertical ridges, and finer cross veinlets between these; height about 1 mm. Emergence takes place in from four to seven days, the duration governed by weather conditions. On April 2nd, while collecting in Millard Canõn, near Pasadena, I observed a dilapidated ♀ *australis* ovipositing on a cruciferous plant, not yet determined, and carefully searching a number of these, I succeeded in collecting 31 eggs and 13 larvæ, the latter apparently all in the first instar. The eggs are variously placed as follows:

1. Eleven on under surface of leaves. In this case the eggs are seldom laid more than half way down the height of the plant, and are placed usually on the basal outer edge of the leaf, although in two cases I found them situated on the extreme edge.

2. On stem. Seven laid erect, at right angles with the stem.

3. Five on sepals of young inner buds.

4. Eight on various parts of the pedicel, but especially on the rachis.

I observed the ♀ oviposit three eggs on a single plant, but in different situations.

Young larva: Not distinguishable from the new-born caterpillar of *E. sara* or *ausonides*, Colour light orange-yellow, this becoming rapidly lighter; head small, almost black; dark coloured hairs scattered sparsely over the body. Length in motion, 1.1 mm.

Euchloe australis I would consider a good subspecies of *lanceolata*, differing at once therefrom in having the apical shading far intenser, and in the different coloration of the secondaries beneath. The size and shape of the apical bar, which Mr. Grinnell (CAN. ENT., p. 73, 1908) states in *lanceolata* is crescent-shaped, and in *australis* straight, has no taxonomic value, as in all our *Euchloids* this character is exceedingly erratic. The type locality of *australis* is Anoyo Seco Canõn and Millard Canõn, Pacific slope of the San Gabriel Mountains, Los Angeles County, California, and it ranges southward to Mexico.

E. lanceolata lanceolata flies as far north as Alaska. Its distribution through Oregon and Washington has not been apparently traced. Mr.

Wm. H. Edwards gives Nevada and Arizona also, but I do not know any precise localities from either of these States.

Chrysophanus mariposa Reakirt.—I find in my note-book a brief description of the egg of this species, found adhering to the abdomen of a ♀ taken at Martina, Missoula County, Montana, in June, 1906. In this case, as I have occasionally noticed in various species, the egg was protruded while the ♀ was in the final pre-mortem state in the cyanide-bottle. The description may be transcribed to: Of the usual hemispherical form, marked with numerous, somewhat shallow, polygonal or semicircular depressions; colour a delicate creamish-green; it proved infertile. Lambert has observed oviposition on the stalk and under side of leaves of *Vaccinium* in Yosemite. Strecker, in his *Lepidoptera, Heterocera Rhopalocera*, p. 91, 1874, writes of *mariposa*: "Lower California. I have seen no examples of this except the original types now in my cabinet." But Reakirt, in his description of *mariposa*, (Proc. Ent. Soc. Phila., VI, p. 149, foot note, 1866), gives California as the type locality. *Mariposa* is a strikingly distinct species, and, to my mind, one of the daintiest of the genus.

Calpodus ethlius Cramer (*chemnis* Fab., *obynthus* B. L.).—Mr. Wm. Schröder, of Los Angeles, bred three specimens of this tropical species from larvæ found on Canna in July, 1906. *Ethlius* is essentially a southern species, not uncommon in the Gulf States, from Texas to Florida, and has been recorded from New York, where the eggs, larvæ or pupæ were probably carried with the food-plant. In South America to Buenos Ayres, Central America, Mexico and West Indies *ethlius* is said to be common. The occurrence in California appears to be accidental.

Eudamus proteus Linn.—This species must apparently be added to the already long list of butterfly emigrants to California. Prof. J. J. Rivers has recently recorded it (Proc. So. Cal. Acad. Sciences) from the vicinity of Santa Monica, and Mr. W. S. Wright (Journ. N. Y. Ent. Soc., XVI, p. 166, 1908) reports it as being fairly common about San Diego. Mr. Wm. Schröder took a good series of *proteus* several years ago in the garden of the California Hospital at Los Angeles, and it is said by other collectors to be abundant in the bean-fields near that city. Still another specimen was taken in an alfalfa field at Porterville, in Tulare County, August, 1904, by Mr. W. M. Davidson, giving *proteus* quite an extended range in this State. The food-plants, as in the east, appear to be leguminous plants.

Mailed September 8th, 1910.



MALE GENITALIA OF TAENIOCAMPA.

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NOTES ON CERTAIN TÆNIOCAMPA SPECIES.

BY JOHN B. SMITH, NEW BRUNSWICK, N. J.

In the CANADIAN ENTOMOLOGIST for June, 1910, Mr. F. H. Wolley Dod has some very interesting notes on certain noctuids, among them some *Tæniocampid* species, in which I have made some studies of my own in time past, and again more recently.

Mr. Dod certainly has an excellent eye for species, and I would as soon trust his comparisons as those of any one I know. But when it comes to a question of determining the *status* of a species, surely we have gotten a little beyond the point when a mere statement that no material differences can be observed, or that they "run together," can be considered as sufficient.

Mr. Dod says that *alia* Gn., is not a *Tæniocampa*, but is an *Hadena*, and the same as the form named *suffusca* by Morrison. In that I am quite willing to follow him, although the type passed the previous scrutiny of Grote, Edwards and Hampson, as well as myself and the others who have looked over the collection. Mr. Dod states that the name *hibisci* Gn., must now be used, although he has seen neither type nor, apparently, description. He is seemingly unfamiliar with the fact that Guenee's name has no type; that the description is based on a figure, and that, as I pointed out in my Revision of *Tæniocampa*, the description was obviously that of Mr. Morrison's *confluens*. We get again the unfortunate condition of the type form of a species being represented by what is really rather an aberration than even a variety. Fitch's name, *instabilis*, will then represent the usual form that we have been accustomed to call *alia*.

Mr. Dod also points out that *pacifica* Harv., has been misidentified heretofore, or rather that specimens not identical with it have been confused under the same name. Again Mr. Dod is probably correct. Dr. Harvey's description specifically calls attention to the absence of the orbicular, although that feature also occurs in specimens of the confused species. In the original description Dr. Harvey refers to his three examples as females, Hampson refers to the types as males, while Mr. Dod refers to a female type. The single example in my collection is not marked Canada, as Mr. Dod says, but "Corvallis, Oregon, IV, 22 at light."

The species is really unique in many ways, and the sexual structures of the male are characteristic and quite unlike those of the allied forms.

In his reference to the species known as *pacifica* Auct., Mr. Dod altogether ignores the fact that I pointed out and figured differences in the genitalic structures of the males between the common eastern and the common western forms, and that, before his statement that the one was a variety of the other could be properly accepted, it was "up to him" to prove that the differences figured were evanescent or non-existent. Instead of that, he does not even refer to them. In view of recent developments in other genera, this method of dealing with the subject will hardly be accepted.

Mr. Dod goes further, and says that my *5-fasciata* is also a mere variation of *hibisci*, and then proposes *latirena* without description and without type, for a form that supposedly is not *5-fasciata*. He thus gives us a mere name, that avowedly does not apply to anything, and instead of writing his own name after it he credits it to "Auct.," whoever that may be in this case; because, so far as I know, no one ever used that term before. Furthermore, *5-fasciata* cannot, as matters stand, be a form of *latirena*; but *latirena* might be a form of *5-fasciata*; with almost as unfortunate a result as making *instabilis* Fitch a form of *hibisci* Gn.

Looking over my material in this group, I find a series of rather more than 40 examples included under the term *pacifica*, reckoning into this also my *5-fasciata*. Of *alia* (*instabilis*) there are thirteen, most of them females; as to localities, they extend across the Continent and down the Pacific Coast to Alameda, California.

This entire series was first separated out carefully into groups, on superficial characters, irrespective of localities, and the groups were afterwards subgrouped according to distribution where there was any difference. Finally, twelve males were selected to represent all possible subdivisions, and of these the abdomens were removed, macerated in caustic potash and the genitalia afterward removed entire.

It might be said here, that nowhere in this series were there hair-pencils or other secondary sexual characters found anywhere on the abdomen. The dissections were made by me, carefully numbered to correspond with the specimens from which they were taken, and each structure, after being cleaned and washed, was placed by itself in a small vial with sufficient carbolic acid to cover, and left to clear. The whole of the dissected material was then turned over to Mr. Grossbeck, who mounted it on slides and made sketches of the various mounts without any knowledge of the specimens from which they came. He selected out six

different types, and his selections agree, except in one instance, with my tentative separation on superficial characters.

After the sketches were made and verified, every other male in the series where the sexual structures were not fully retracted was closely examined, the scales being removed wherever necessary, so as to make sure of the correctness of the association. It is interesting to note that in the whole of what may be termed the *instabilis* series the penis sheath is unusually long, and is furnished at tip with a very long corneous spine, set at right angles to the stem. I am aware that I should have examined a series of females to determine the function of this structure, if possible; but that can be easily done later by some younger man with more leisure than I.

It was also noted that there were two types of uncus represented; one with a spear-shaped tip, the other tapering to a normal point. I am not quite sure how much absolute value should be attributed to this. All the eastern males, *hibisci* and *instabilis*, and all the Calgary males, have the spear-shaped tip. With one exception all the western forms, *pacifica* "Auct.," have the slender, gradually pointed tip.

The common eastern form will, if Gueneé's description based on a picture is accepted, be known as *hibisci*, with *confluens* Morr. as a synonym, and of this I have at present one ♀ from Long Island, N. Y. The more normal type, which is *instabilis* Fitch, is represented from New Jersey to Maine, Canada, and westward to Decorah, Iowa, and Volga, So. Dakota. It has a reddish-gray base, is mottled with darker brown, slender, transverse strigæ, not so closely placed as to obscure the maculation, s. t. line fairly marked, with obvious reddish-brown preceding shades. The median lines tend to become lost, especially in the female; but they are usually traceable as shadings if not otherwise. The reniform is always, the orbicular is usually uniformly dusky, and outlined by a narrow pale line. A reddish or somewhat dusky median shade may or may not be obvious. On the whole the species is a quietly-marked one, and its dominant impression is of a reddish-gray form.

The male genitalia are characteristic. The uncus is spear-shaped at tip, the clasper long, stout, curved, scarcely dilated medially; the harpes are inferiorly drawn out into a long tip, in an almost direct continuation of the inferior margin; upper angle acute, but not drawn out, the tip oblique and not arcuate. Reference is made to figure 1 of Plate VIII for a better understanding of the structure.

An intensification of this type occurs in Colorado, and may be known as *Brucei*. It is brighter, more reddish-gray, the transverse strigæ are less

obvious, the median lines are better marked, the s. t. line is preceded by a more obvious reddish shade, and the median shade is well marked in the male and conspicuous in the female. It really looks more like *subterminata* (*revicta*) at first sight ; but closer study shows it a more brilliant *instabilis*.

As to sexual structure, the type is very similar to that described for *instabilis*, with the following differences : The uncus is not spear-shaped at tip, but is slender and drawn to a long point ; the lower angle of harpe at tip is not drawn out on a line with the lower margin, but forms a slight curve ; the upper angle is a little produced, so that the tip seems, and actually is, broader than it is nearer the base. The clasper is more slender and not so large.

Again reference is made to Plate VIII, and figure 2 should be consulted and compared to bring out the differences. These two figures, 1 and 2, should be compared with those of the following, particularly in the form of the tips of the harpes.

Only two examples of this form are at hand : The male from Denver, Colorado, IV, 20 ; the female from Garfield Co., Colorado, 6,600 feet (David Bruce).

Under the name *malora*, I have separated out three males and two females from Calgary, IV, 24, and V, 2, which may be described as being *instabilis* with practically all the red eliminated. It is a dull gray-looking form, with the transverse strigation very dense and coarse, giving a smoky impression. The median lines are fairly obvious, the t. a. line tending to become a band, while the t. p. line may have a paler following shade. In most cases a broad, obscure diffuse median shade is obvious. The s. t. line is pale, not distinct, and the preceding shade is not well marked nor tinged with red. Altogether the impression is of a dull smoky-gray form.

The genitalia of the male are interesting, and are identical in the three examples studied. The uncus is spear-shaped at tip, as with *instabilis*, but the harpes are quite different. They are decidedly more curved, distinctly narrowed before tip, the lower margin prolonged into a long-curved spine, the upper angle drawn out into a little point, while the outer margin is distinctly arcuate. A modification of this type of tip occurs in all the other western forms, in contrast to the *instabilis* type shown in figures 1 and 2. Figure 3, representing this species, should also be compared with the next following. The primary clasper is a long curved hook without obvious dilations.

An irregularly-mottled form, for which I propose the term *nubilata*, occurs in Colorado. It ranges from gray to almost brick-red, the transverse

strigæ are coarse and irregularly distributed, and the median lines are fragmentary and indicated rather by cloudings or groupings of the strigæ. Almost all the examples are more or less mottled along the costal area with yellowish, and atoms of this colour are more or less obvious throughout the wing. The median shade may be absent or may form a cloud, taking in most of the median space. The s. t. line is yellowish, usually distinct and usually also with a fragmentary preceding shade. The ordinary spots are large, outlined in yellowish, the reniform dusky, orbicular irregular and reaching to or uniting with the reniform more frequently than in the other forms.

Unfortunately, in the series of 10 specimens, there are only two males; but these are alike in genital structure and are quite different from any other species. The uncus is rather stout, drawn out to a gradual point. The harpes narrow to an unusually short small tip, which has only a little, short acute process inferiorly and has the upper angle rounded. It represents the extreme in reduction in this series. The clasper is stout, moderate in length, not so much curved, and is distinctly enlarged or dilated at about its middle. Figure 4 shows obviously the characteristic differences between this form and all others of the series.

Localities are: Garfield Co., Colo., 6,000 ft. (Bruce); Glenwood Springs, Colo., May 6 (Barnes); Denver, Colo., IV, 20.

On the Pacific Coast there are three or four species aside from the true *pacifica*, but the material is not so satisfactory in this series as I could wish.

First of all is a species that I call *inflava*. It is quite a uniform carneau-gray, not mottled, without transverse strigæ, median lines lost, s. t. line very distinct, yellow, with scarcely marked preceding shades, the ordinary spots distinctly outlined in yellow. The very even colouring, contrasting s. t. line and rather conspicuous ordinary spots characterize the species superficially.

I have only two males and one female from Pullman, Washington, and Vancouver, B. C., all taken in April. The males, which resemble each other closely, although they come from the two extreme localities, differ in genital structure from all the other Pacific Coast forms by having the tip of the uncus spear-shaped. In other respects the resemblance to *inherita* is rather close, as an examination of figure 5 will make clear. I believe this to be a good species, but the material is scant and the possibility of error is not excluded.

Inherita might be mistaken at first for a well-marked, robust *malora*. It is generally pearl-gray, but occasionally becomes tinged with reddish.

The transverse strigæ are usually very fine, and give the surface a characteristic irrorate appearance. The median lines are generally lost, except on costa; but there is usually an obvious or even conspicuous median shade which may be quite well defined or quite diffused. The s. t. line is narrow, pale, usually preceded by a fairly well-defined though narrow preceding brown shade. The genitalia of the male differ from all those previously described by the short, stout, strongly-curved clasper, which is distinctly dilated at about its middle. The tip of harpes is only moderately elongated, strongly constricted before its terminal enlargement, and the inferior margin is prolonged into a moderate curved extension. The uncus is slender, tapering to tip, and in that respect it differs from *inflava*. Figure 6 will illustrate the structure more satisfactorily.

It might be added that there is the same tendency here for the ordinary spots to become confluent, that is found in *nubilata*. I have seven males and one female from Corvallis, Oregon, March 31st to April 29th; Olympia, Washington, April 7th; Vancouver, B. C., April 6th.

T. 5-fasciata Smith is another of those species resembling *subterminata* in superficial appearance and habitus. It is of a pale carneau-gray, more or less shaded with reddish, without transverse strigæ and with all transverse lines and markings distinctly written. The species is absolutely not to be confused with anything else. I have at present four males and two females from Wellington and Vancouver, B. C., and Pullman, Washington.

In genital structure this species resembles *inherita*, but the clasper is much longer, much more slender, the harpes are longer, much more constricted before tip, and the curved process from lower angle of tip is much larger in all respects. Figure 7 will show these points more satisfactorily.

A single male example from Alameda County, California, in January, differs superficially from *inherita*, but agrees almost exactly in genitalic structure. It is at least an even chance that it is only a local form of *inherita*, but I will call it *proba*. It is rather uniform brick-reddish in colour, with rather coarse, purplish transverse strigæ, not very closely placed, a tendency to yellowish irrorations, median lines marked on costal region only, no obvious median shade, s. t. line yellowish, narrow but well defined, without shadings on either side. The ordinary spots are narrowly pale-ringed; orbicular concolorous, reniform darkened by purplish strigæ. The secondaries are shining yellowish.

T. pacifica Harvey, as identified by Mr. Dod, is altogether different from any of the species above mentioned in appearance and structure. For comparison the genitalia are shown at figure 8 on the plate.

My conception of the synonymy of our species of *Teniocampa* of the *instabilis* section is as follows :

T. instabilis Fitch.

alia Auct., in error, not Gueneé.

var. *hibisci* Gn.

confluens Morr.

T. Brucei Smith.

§*pacifica* Auct.

T. malora Smith.

T. nubilata Smith.

T. inflava Smith.

T. inherita Smith.

T. 5-fasciata Smith.

T. proba Smith.

T. pacifica Harvey.

Teniocampa latirena Dod has no type, and is impossible to apply except as a synonym of the entire *pacifica* Auct. series.

I might add, in this connection, that I do not accept Mr. Dod's reference of *T. saleppa* to *T. præses*, but must reserve my comments on that point for another occasion.

HOSTS OF STREPSIPTERA.

BY CHARLES ROBERTSON, CARLINVILLE, ILL.

Mr. W. Dwight Pierce has recently published a monographic revision of the Strepsiptera, as Bulletin 66 of the U. S. National Museum. This paper brings up a number of interesting points regarding some of the hosts of these parasites. For some time I have had occasion to identify many insect visitors of flowers, and, while no insects were collected and none were carefully examined for that purpose, I have marked the specimens on which the parasites were noticed, so that they could be taken out when wanted. The result is that, while I have only recorded three cases, and have made no effort to anticipate any one, I am able, with the records here given, to be the first to record 30 per cent. of the known North American Hymenopterous hosts, and my collection contains 36 per cent. of them. That one man could do this in one locality, with a few observations in

another, shows the fragmentary nature of the material upon which Mr. Pierce's observations are based.

The following is a list of these species. The parasites of 1, 3, 4, 11-13 and 21 are described by Pierce, and 7, 22 and 29 are mentioned in his host list. The others are new. 1, 4 and 7 are recorded in Trans. Am. Ent. Soc., XVIII, 52-59, 1891:

CARLINVILLE, ILL.

ANDRENIDÆ.

1. *Trachandrena claytoniæ*.—April 1.
2. " *nuda*.—March 17.
3. " *hippotes*.—April 10.
4. *Andrena illinoensis*.—April 17.
5. " *salictaria*.—April 2, 10, 11, 12, 17.
6. " *mandibularis*.—March 21, 29, April 10.
7. *Ptilandrena erigeniæ*.—April 11.
8. *Parundrena andrenoides*.—April 1, 10, 11, 26, 29.
9. *Pterandrena asteris*.—Sept. 8.

HALICTIDÆ.

10. *Augochlora viridula*.—Sept. 17.
11. *Chloralictus sparsus*.—April 19, May 31, July 15, 27, Sept. 11, 17, Oct. 20, 25.
12. *Chloralictus versatus*.—April 11, Nov. 3.
13. " *zephyrus*.—April 12, July 21, 24, 27.
14. " *nymphæarum*.—

PANURGIDÆ.

15. *Pseudopanurgus labrosus*.—July 3.
16. " *labrosiformis*.—Aug. 3.
17. " *rudbeckiæ*.—Aug. 1, 29.
18. " *solidaginis*.—Aug. 11, 12.

SPHECIDÆ.

19. *Sphex vulgaris*.—June 5, Oct. 9.
20. " *pictipennis*.—
21. *ProterospheX ichneumoneus*.—Aug. 26.

VESPIDÆ.

22. *Polistes variatus*.—Sept. 30.

EUMENIDÆ.

23. *Ancistrocerus tigris*.—Sept. 23.
24. " *histrionalis*.—Aug. 5, 27.
25. " *clypeatus*.—May 24, 31.

26. *Leionotus anormis* (taos).—May 31, Oct. 29.
 27. " *fundatus*.—June 25, July 19.
 28. " *arvensis*.—Aug. 2.
 29. " *foraminatus*.—Aug. 13.
 30. " *pedestris*.—July 6.

ORLANDO, FLA.

31. " *fundatiformis*.—Feb. 17.

INVERNESS, FLA.

32. " *bifurcus*.—March 3.
 33. " *turpis*.—March 19.
 34. *Ancistrocerus histrio*.—March 20, 24.
 35. *Odynerus erynnys*.—Feb. 10, March 10, 25.

TEXAS, BELFRAGE.

36. *Trachandrena verecunda*.—Cresson, in Col. Am. Ent. Soc. *Types*.

The following host species, followed by the number of species of flowers on which each was taken, have not been observed to be infested at Carlinville :

- Eumenidæ.—*Monobia quadridens*, 12 ; *Ancistrocerus campestris*, 18.
 Vespidae.—*Polistes annularis*, 20 ; *P. metricus*, 43 ; *P. rubiginosus*, 18.
 Sphecidae.—*Proterospheex pennsylvanicus*, 13 ; *Priononyxa atrata*, 38 ; *Sphex intercepta*, 52 ; *S. procera*, 35.
 Halictidae.—*Chloralictus albipennis*, 17.
 Andrenidæ.—*Andrena corni*, 1 ; *A. Nasonii*, 14 ; *A. nubicula*, 6 ;
Opandrena bipunctata, 33 ; *O. Cressonii*, 54 ; *O. Robertsonii*, 7 ;
Ptilandrena Polemonii, 3 ; *Pterandrena solidaginis*, 14.

The determination of *Ptilandrena Polemonii*, which Pierce marks doubtful, is probably incorrect. *Andrena illinoensis* is probably incorrectly determined, though it is a *Stylops* host. After I described *A. illinoensis* I mixed *salictaria* with it, and I may have sent out this species under the former name. I have suspected that the bee identified as *Chloralictus albipennis* might be *nymphæarum*. And it seems strange that I should find *Pterandrena asteris* stylopized, but not *P. solidaginis*. Nevertheless, it is evident that the geographical range of the Strepsiptera is not so closely correlated with that of the hosts as might be expected, if every parasite is a distinct species. In Florida, where I observed only 22 flower-visits of *Odynerini*, I found 5 infested species, while in Illinois I found only 8, after observing 339 flower-visits,

Pierce gives a list of 14 Andrenidæ in which the transverse cubital nervures are sometimes wanting. The list is credited to Crawford, but, except for one name, it was copied from my list in Tr. Am. Ent. Soc., XXVIII, 189, 1902.

Of the 14 species, 7 are known to be parasitized, a pretty good percentage. There is evidently a relation, but not what is supposed by Pierce and Crawford. *Prosopis* has a nervure wanting, and so do the Panurgidæ. In a general way small bees seem to be more likely to be stylopized, and more likely to lose the transverse cubitals. I have observed these nervures wanting in the following 18 species of local Andrenidæ: *Andrena arabis*, *nubicula*, *nothoscordi*, *erythrogastra*, *geranii*, *illinoensis*, *platyparia*, *Pterandrena asteris*, *solidaginis*, *krigiana*, *Opandrena bipunctata*, *personata*, *Robertsonii*, *Cressonii*, *Trachandrena claytoniae*, *hippotes*, *Forbesii*, and almost always in *Parandrena andrenoides*. Nine of these are stylopized species. The species of *Andrena* are small or middle-sized. Those of *Pterandrena* are the smallest. *Trachandrena* is composed of middle-sized species, but *claytoniae* is the smallest. Among bees, at least, the stylopized species are generally small, and they are the ones usually losing a transverse cubital. Among some large bees, when the second cubital cell is small and the nervures closely approximated, there is a tendency for one of the transverse cubitals to be obliterated. Among the Nomadidæ, which are not stylopized, I have found a transverse cubital wanting in *Centrias americanus*, *rubicundus*, *Phor integer*, *Gnathias cuneatus*, *Nomada Cressonii*, *Sayi*, *illinoensis*, *parva*, and almost always in *Heminomada obliterated*. In Sphecodini I have found transverse cubitals wanting in *Sphecodes arvensis*, *Drepanium falciferum*, *Sphecodium pimpinellæ*, *Cressonii*, *Machieris stygia*, and always in *Dialonia antennariæ*. The veins are wanting in 17 out of 49 Andrenidæ, 9 out of 23 Nomadidæ, 6 out of 12 Sphecodini. The second transverse cubital is sometimes wanting in *Chloralictus sparsus*, which is a stylopized species, and almost always in *Dialictus anomalus*, which is not known to be so. Thus the tendency to obliteration is no more evident in the Andrenidæ, which are stylopized, than in the Nomadidæ and Sphecodini, which are not. The apparent correlation is the result of the occurrence of both phenomena in bees of small size.

In regard to the copulation of stylopized bees, I have observed three cases: *Andrena salictaria*, both sexes bearing Stylops; *Parandrena andrenoides*, the ♀ stylopized; *Pseudopanurgus rudbeckiæ*, the ♂ stylopized.

On page 41 Pierce says: "The majority of the hosts known are flower-frequenters, and are classed as oligotropic when visiting a single species, genus or family of flowers, and polytropic when visiting many genera or families of flowers. It is very reasonable to infer that the most ordinary method of transfer of triungulids takes place at flowers, because of the analogous forms of strepsipterous and rhipiphorid triungulids. Most of the wasps are flower-visitors, because they can quench their thirst in the nectarine liquids. They are consequently polytropic; but the bees are more highly developed, and often specially adapted for particular flowers, hence many of them are oligotropic." Loew introduced these terms to distinguish bees like *Bombus*, which fly all season and visit a great variety of flowers, which he called polytropic, from bees like *Anthophora*, which have a short flight and visit comparatively few flowers, which he called oligotropic. He calls the females of *Halictus* polytropic, and the males, which appear late and fly a shorter time, oligotropic. In their visits for nectar bees resemble other flower-visitors, but in the visits of the females for pollen to provision their nests, bees show their essential bionomic relations to flowers and their essential differences from other insects. Therefore, being the first to use Loew's terms, at least in English, I limited the term oligotropic to bees which collect pollen from flowers of some particular natural group, and the term polytropic to those which use pollen from unrelated flowers. (Bot. Gaz., XXVIII, 27, 29, 1899) I have recorded 56 cases of these oligotropic bees. Of these only 20 are limited in their nectar visits also. Of 17 local stylopized Andrenidæ, only one is oligotropic in the sense used by Pierce. Most of the 20 are oligotropes of Compositæ. It is not so surprising that some of these are exclusive when we consider that at their maximum the Compositæ form 34 per cent. of the indigenous blooming flowers. I do not regard statements that a bee is oligotropic, unless made by a person who has made a great number of observations on flowers, and who distinguishes whether the females collect the pollen or not. Wasps have never been called polytropic except by Pierce. If these terms are applied to wasps, they should be used to distinguish wasps which provision their nests with insects of the same natural group from those which use an indiscriminate variety of insects for that purpose.

On flowers wasps are hardly polytropic in any sense. I have observed 1,949 flower visits of 208 species. The ones making 40 or more visits are: *Scolia bicincta*, 40; *Eumenes fraternus*, 41; *Polistes metricus*, 43; *Sphex vulgaris*, 46; *Myzine sexcincta*, 50; *Polistes variatus*, 51; *Sphex intercepta*,

52; *Leionotus foraminatus*, 53. *Leionotus foraminatus* is surpassed in number of visits by 27 species of bees. I have observed 6,142 flower visits of 297 species of bees. The average for wasps is 9, and for bees 20.

Pierce gives a table of 17 species of stylopized Andrenidæ, of which only three appear to be oligotropic in the sense in which he uses the term. In my table of oligotropes, one of these was stated to visit two other flowers besides *Polemonium*. At least five are oligotropic in the sense used by me.

The following table contains 17 species of local Andrenidæ, eight of which are oligotropic and nine polytropic :

HOST BEES.	Visits for pollen.	Visits for nectar to related flowers.	Visits for nectar.	Visits for nectar to unrelated flowers.	Total.	Time of flight.	Visited for pollen.
OLIGOTROPES.							
<i>Ptilandrena erigeniæ</i>	1			2	3	Mar. 26-May 14	<i>Claytonia virginica</i>
" <i>polemonii</i>	1			2	3	Apr. 20-May 20	<i>Polemonium reptans</i>
<i>Parandrena andrenoides</i>	3	1		9	13	Mar. 20-June 5	<i>Salix</i>
<i>Andrena illinoensis</i>	3	1		3	7	Mar. 25-May 24	"
" <i>salictaria</i>	4			7	11	Mar. 31-June 22	"
" <i>nubicula</i>	5	1		6	6	Aug. 13-Oct. 30	<i>Compositæ</i>
<i>Pterandrena asteris</i>	6	2		1	9	Sept. 8-Oct. 21	"
" <i>solidaginis</i>	9	2		3	14	Aug. 13-Oct. 22	"
POLYTROPES.							
<i>Opandrena bipunctata</i>	15		18		33	Mar. 17-June 1	8 families
" <i>Cressonii</i>	35		19		54	Mar. 21-June 14	15 "
" <i>Robertsonii</i>	5		2		7	May 4-July 7	4 "
<i>Andrena corni</i>			1		1	June 8	
" <i>mandibularis</i>	7		12		19	Mar. 17-May 22	5 "
" <i>Nasonii</i>	10		4		14	Apr. 21-May 31	5 "
<i>Trachandrena claytoniæ</i>	17		17		36	Apr. 10-June 19	8 "
" <i>hippotes</i>	7		11		18	Apr. 10-June 29	4 "
" <i>nuda</i>	9		7		16	Mar. 17-June 16	5 "
<i>Chloralictus zephyrus</i>					68	March-Nov.	
" <i>sparsus</i>					141	" "	
" <i>versatus</i>					217	" "	
OLIGOTROPES.							
<i>Pseud. labrosiformis</i>	7	4			11	Aug. 3-Sept. 25	<i>Compositæ</i>
" <i>labrosus</i>	3	1			4	" 1- " 28	"
" <i>rudbeckiæ</i>	5	1			6	" 1- " 12	"
" <i>solidaginis</i>	4	3			7	" 11-Oct. 4	"

The facts about the flower visits of stylopized bees are about as follows: *Prosopis* is essentially polytropic. The Andrenidæ are partly oligotropic and partly polytropic. Of 44 species which I have observed

enough to justify an opinion, 22 are oligotropic and 22 polytropic. It is doubtful whether a true *Panurginus* occurs in America. *Pseudopanurgus* is composed of oligotropes of Compositæ. The Halictidæ are among the most polytropic of bees, only being surpassed by *Apis* and *Bombus*. The general character of the hosts does not show that it is an important matter whether the hosts are oligotropic or not. Among the Andrenidæ in particular, it does not appear that oligotropic species are any more apt to be infested than polytropic. There is a better basis for the proposition that the Strepsiptera prefer bees of small size. Pierce says: "No relationship can be found between the parasites and the artificial subgenera designated for *Andrena* by Robertson." One would hardly expect them to show any relation to artificial subgenera. Even if my divisions of Andrenidæ could be shown to be artificial, it would not follow that there are no natural groups into which the species fall. The fact that Pierce can only arrange the Stylopidæ in the alphabetical order of their names, does not indicate that they are likely to conform to any natural groups. If Pierce's statements about the importance of observing the flower visits of the hosts were valid, my genera would be valuable for his purpose, for four of them, *Iomelessa*, *Parandrena*, *Ptilandrena* and *Pterandrena*, are oligotropic. The preference of Strepsiptera for particular hosts does not appear to be of any decisive value in determining the taxonomy of the hosts. The Xenidæ infest the Halictidæ, and then, instead of extending to the Andrenidæ, which Pierce includes in the same family, they pay their attentions to Vespidæ, Eumenidæ and Sphecidæ. They even infest the Panurgidæ, which are more nearly related to Andrenidæ than to the Halictidæ. *Stylops* seems to show a fine sense of specific distinctions, but to be quite stupid in regard to natural groups. I think that if statistics be applied to the measurements of the stylopized and non-stylopized species, it will establish a strong general presumption that *Stylops* prefers small species of Andrenidæ without regard to their natural grouping.

While it is probable that some species of *Stylops* limit themselves to particular species of Andrenidæ, there is a strong presumption that some of them do not. The validity of the species can only be established by the ability of the taxonomist to identify them without knowing the hosts from which they come.

Pierce's names suggest an interesting taxonomic matter which does not seem to have been properly considered. This is not the only case I have noticed, nor the worst, but is a fair example. To prevent endless changes, a good many taxonomists have, with reason, decided that a name

belongs to the thing to which it is assigned, and cannot be emended on account of some error connected with its formation. The decision that caconyms shall not be emended does not imply that the rule that names should have a respectable Latin form is not a good one, or that authors need not exercise any care about their construction. One who holds that caconyms should not be emended, ought to be careful not to oppress biological nomenclature with linguistic monstrosities. While I have tried to avoid making caconyms, I believe that they should be emended, and that some day they will be. Scientific minds do not have any particular reverence for the opinions of their predecessors, particularly the dogmatic ones, and some day the name-sharps will have little to do but emend caconyms. Take the case of *Xenos*--Rossi, Kirby, Hoeven, Saunders, Pierce; *Xenus*--Rye, Cent. Dictionary, Stiles. Pierce says *Xenos* is from $\xi\nu\sigma$ or $\xi\epsilon\nu\sigma$. So *Xenos* seems to be a caconym for *Xenus* or *Xinus*. Pierce decides that it should not be emended. When he decides that it should be imitated it is another matter, but a rather usual and not unnatural consequence of the rule against emendation. Saunders had previously invented *Paraxenos* and *Pseudoxenos*. Pierce adds *Halictoxenos*, *Leionotoxenos* and *Vespaxenos*. He says the latter is derived from *Vespa* and *Xenos*. Since one word is Latin, it does not seem necessary to insist on a Greek ending for the compound. *Vespaxenos* looks like a caconym for *Vespixenus*.

One objection to caconyms is that they lead to personal reflections. One may be very careless in his name-making and very careful in his other biological work, but some people may not think so.

A NEW GEOMETRID GENUS AND NEW SPECIES FROM THE EXTREME SOUTH-WEST.

BY RICHARD F. PEARSALL, BROOKLYN, NEW YORK.

Several years ago, through the generosity of Dr. John B. Smith, I received a box of Geometrid specimens, collected in the Arizona Desert, near Yuma, and at Walters' Station, Calif. It was not difficult to find names for most of these, but the following species have given me some trouble, since this region might well be supposed to harbour occasional Mexican forms. Having this in mind, I have waited an opportunity to study the Schaus collection at Washington, which did not occur until April of this year. In it, so far as I could discover, in all too brief an examination, there is no genus or species to represent one at least of them,

October, 1910

and I have therefore been compelled to erect a new genus—and to name the species as well. The occasion seemed a fitting one to link the names of two of our pioneers in entomology, old and intimate friends since the science was young in this country, and friends of the writer in later years, Edward L. Græf, of Brooklyn, and Dr. John B. Smith, of New Jersey, under the appellation, *Græfia Smithii*, n. sp.

Genus *Græfia*, n. g.

Palpi long, slender, scaled; antennæ bipectinate to apex. Tongue obsolete. Front, thorax and abdomen narrow and smooth scaled. Legs long, slender, with two pairs of spurs on hind tibiæ, no hair pencil. Fore wings: twelve veins, three and four widely separate, six and seven very short-stemmed or separate, with fovea at base. Hind wings: three and four separate, six and seven long-stemmed, eight approximates cell only near base, where there is a small fovea.

The above characters are drawn from the male only, the female being unknown at present. When found she will undoubtedly prove wingless, as in *Coniodes* Hulst, next to which genus this should be placed. It differs as follows: vein five of fore wings normal, vein eight approximates cell only near base, and in the absence of spines on the abdomen—present in both sexes in *Coniodes*.

Type: *Græfia Smithii*, n. sp.—Expanse, 30 mm. Head rather prominent. Front somewhat retreating, rounded. Antennæ long, of a dusky brown, rather loosely bipectinate to apex, not so plumose as in *Coniodes*. Head, thorax and abdomen smooth-scaled, dusky brown, the patagiæ ending with long hair-like scales. All wings broad, the primaries slightly produced at apices, covered thickly with dusky-brown scales; with those are mingled, more or less abundantly, dingy, yellowish scales, and over all a heavy covering of long dusky hairs, appearing as if brushed smooth from base toward apex. Only basal and extradiscal lines are pictured, the former frequently absent, generally as a diffuse, broad, blackish shade, one-fourth out from base at costa, rounding sharply outward, thence with a slight basal incline, to inner margin. Extradiscal similar, sometimes a little blackish, especially at costa, where it starts one-fourth from apex, curving regularly outward to vein seven, thence parallel with outer margin, having a slight basal trend as it nears inner margin. This line is often only a series of blackish diffuse spots on veins. Discal dots are diffuse black, large on primaries, very small on secondaries, the latter being only slightly paler in colour than primaries, with a silken

sheen ; hairs less abundant, placed principally along veins and beneath cell. Fringes long, silken, same colour as primaries.

Beneath as above in colour, a shade paler and slightly glossy, the hairs less numerous, chiefly along costal region of primaries. No markings except the diffuse, dusky, discal dot on primaries. Body and legs of the same colour, the fore and middle femora rather heavily clothed with black scales in front.

The type male, one of several taken in April at Walters' Station, Calif., is in the author's collection. Co-types from the same locality will be placed in the Rutgers College collection and the U. S. Nat. Museum. A single co-type recently received from San Diego, Calif., taken April 10th, 1910, is almost worthy of varietal distinction. This example is smaller, only 25 mm. expanse, the wings are more rounded at apices, so thin in texture that the label beneath can be read through them, and the extradiscal line runs closer to discal dot.

(To be continued.)

BASILONA IMPERIALIS DRURY.

On June 26th last, a fine male specimen of this handsome moth was taken by Mr. W. H. G. Garrioch, at an arc light near his residence, on Front street, Hull. He had taken a like specimen a few night previously at the same place. Both specimens were brought to me while they were yet alive, and I have set them up. *As far as I know, these captures of B. imperialis are the first recorded for the Province of Quebec.*

Mr. Arthur Gibson has given me permission to add to this note the following statement : "I, too, have a record of three specimens occurring at the electric light here on the Farm, viz. : on June 22, I saw the upper wing of a specimen lying on the grass, near an electric light ; on June 24th a male was taken at the electric light, by one of the working men on the Farm, and brought to me for identification, and, on June 26th, another male was captured on the Farm by another employee."

The Central Experimental Farm is on the Ontario side of the River Ottawa, a few miles from Hull ; and, as there is much young pine growing on the banks of the river, it is probable that *B. imperialis* has adopted the neighborhood as one of its habitats.

THOMAS W. FYLES.

Hull, P. Q., July 19th, 1910.

THE ORTHOPTERA OF WESTERN CANADA.

BY THE EDITOR.

(Continued from page 300.)

Subfamily Acridiinae.

64. *Hypochlora alba* (Dodge).MAN.—(Bruner¹.)*65. *Bradynotes expleta* Scudd.?

B. C.—Mount Chéam, 7,000 ft., Aug. 15. (Fletcher.)

This specimen is in bad condition, and I place it doubtfully here. It is, however, a true *Bradynotes*, and the first of this genus to be recorded from Canada.

66. *Podisma nuda* (Walk.).

ALTA.—Banff, 2 ♂'s, 1 ♀. (Sansón.) Also recorded from Laggan by Walker.

B. C.—Sandon. (Walker.) Also recorded as *P. polita* Scudd., from the Kitchener Glacier on Mt. Kokanee by Caudell⁴. Mr. Caudell has kindly sent me for study the single female upon which this record is based, and it seems to differ in no way from *P. nuda*.

This species has been hitherto known as *Asemoplus nudus*, but it is generically distinct from a single female *Asemoplus* in my collection, which Dr. Scudder considered was probably the female of *A. montanus* (Bruner), the type of the genus.

I placed *P. nuda* in *Asemoplus* on Dr. Scudder's authority, but before submitting my specimens to him I had determined the species with very little doubt as *Bradynotes hispida* (Bruner). Some years later my attention was again called to the agreement between my species and the description and figures of *B. hispida* in Scudder's Revision of Melanopli. Prof. Morse then kindly compared co-types of *P. nuda* in the Museum of Comparative Zoology with the two specimens (females) of *B. hispida* there, and found them very closely related if not identical. He also stated that my *P. nuda* did not belong to *Asemoplus*. Mr. Caudell, in a letter to whom I expressed my belief that "*Asemoplus nudus*" was not generically distinct from *Podisma*,

*Small numerals following an authority's name refer to same numerals in the list of references.

replied that he was likewise of the opinion that it was a *Podisma* rather than a *Bradynotes*.

Since the above was written I have seen the specimens of *B. hispida* in the Museum of Comparative Zoology, and believe them to be congeneric, but not conspecific with *P. nuda*.

67. *Podisma Oregonensis* (Thomas).

ALTA.—(Macleod, Scudder⁵.)

68. *Melanoplus Kennicottii* Scudder.

SASK.—Souris River. (Scudder.²) Rudy. (Rehn.)

ALTA.—Slope of Mt. Rundle, near Banff, Sept. 13, 1909, 2 ♂'s; July 23, 1909, 1 ♀. (Sanson.)

69. *Melanoplus Bruneri* Scudder.

Syn.—*M. Alaskanus* Scudd.

MAN.—Kenville, Swan River District, 1 ♂, 1 ♀. (Alexander.)

SASK.—Langham, 2 ♂'s. (Alexander.) Saskatoon, July, 1906, 1 ♀. (Willing.) Prince Albert, June 6, 1910, 1 ♂. (Fletcher.)

ALTA.—Lloydminster, 5 ♂'s, 1 ♀; Red Deer, 3 ♂'s, 5 ♀'s; Vermilion, 6 ♂'s, 3 ♀'s. (Alexander.) Banff and vicinity, July 23, 1909, 2 ♂'s (teneral); July 30, 31, 1908, 2 ♀'s; Aug. 5, 1908, 2 ♀'s; Aug. 14, 16, 1909, 1 ♂, 6 ♀; Sept. 2, 1909, 1 ♀; Sept. 4, 1908, 1 ♂; Sept. 13, 1909, 2 ♂'s. (Sanson.) Also recorded from Macleod (Scudder⁵) and Banff (Scudder⁵, Rehn).

B. C.—Spilmacheen. (Scudder⁵.)

There is some uncertainty of the correctness of the label upon the specimen which I recorded from Vernon, and I doubt if this boreal species occurs there.

All gradations are represented in this series, from typical *Bruneri* to the *Alaskanus* type, in which the apical margin of the subgenital plate is notched in the male. The same variations appear in a series from northern Ontario, although the *Alaskanus* type is apparently commoner in the west. It seems to have no racial or varietal significance.

Specimens of the *Alaskanus* form were received from Langham, Vermilion and Banff. Typical *Bruneri* were also taken at these localities. The specimens from Lloydminster are all about intermediate,

70. *Melanoplus affinis* Scudder.

B. C.—Nicola Valley, Aug. 20, 1901, 1 ♂. (Fletcher.) Also previously recorded from this locality and Vernon by Walker, and from the Province, without further data, by Scudder⁵.

71. *Melanoplus bilituratus* (Walker).

MAN.—Aweme. (Fletcher².)

B. C.—Victoria, Vancouver Id., Sicamous. (Scudder⁵.) Donald, Vernon, Discovery Id., Duncans, Nanaimo and Riddell, Vancouver Id. and Kelowna. (Walker.)

The occurrence of this Pacific Coast species in Manitoba seems improbable, and I feel some doubt as to the correctness of the determination.

72. *Melanoplus atlanis* Riley.

MAN.—Deloraine, June 15, 1901, 1 ♂. (Fletcher.) Aweme, Aug. 14, 1906, 1 ♂. (Criddle.) Winnipeg, Aug. 30, 1909, 1 ♂. (Willing.) Also recorded previously from Winnipeg by Scudder⁵, and from near Rosebank (Walker).

SASK.—Regina, Aug. 23, 1908, 1 ♀. (Willing.) Also recorded from Moose Jaw by Caudell¹ and Walker, and from Parkbeg by Walker.

ALTA.—Metaskiwin, 1 ♀. (Alexander.) North of Olds, Sept. 13, 1902, 3 ♂'s, 1 ♀. Walsh,* Aug. 23, 1901, 2 ♂'s, 1 ♀. (Willing.) Bankhead, Sept. 11, 1908, 1 ♂, 1 ♀. Banff, Aug. 5, 11, 1908, 3 ♀'s; Aug. 6, 16, 1909, 1 ♂, 1 ♀; Sept. 11, 1908, 1 ♂, 1 ♀; Sept. 13, 1909, 1 ♀. Tunnel Mt. Flats, Sept. 3, 14, 1908, 2 ♀'s; Sept. 1, 1909, 1 ♀. (Sanson.) Also recorded from Macleod, Calgary, Banff and Laggan by Scudder⁵, and Kamanaskis and Banff by Walker.

B. C.—Cranbrook, 1 ♀; Nelson, 6 ♂'s, 4 ♀'s; Greenwood, 2 ♂'s; Kamloops, 6 ♂'s, 3 ♀'s. (Alexander.) Kelowna, Aug. 23, 1901, 1 ♂. (Fletcher.) Also recorded from Vancouver by Scudder (Rep. U. S. Ent. Com., 11, App., 24, 1880), Agassiz and Vernon by Walker, Kaslo by Caudell¹, and Beaver-mouth by Rehn.

Very great variation is seen in this series. The specimens from Kamloops, except one female, some of those from Banff, and a pair from Olds, are much above the average size, being as large or nearly so, as *M. spretis*. Specimens previously recorded

*Previous references to Olds, Walsh, Leduc and Medicine Hat were placed by error in the Saskatchewan lists.

from Vernon are equally large. One very large female from Kamloops has yellow streaks along the lateral carinae like those commonly present in *M. Bruneri*. In a very large male from Olds the tegmina are as long as in *M. spretis*, while in another large one from the same locality they are of ordinary length. In the female from Cranbrook the tegmina do not quite reach the end of the abdomen, and the hind tibiae are pale green. Green hind tibiae occur also in specimens from Banff, and in a number from Manitoba, which bear no labels.

73. *Melanoplus spretis* Thomas.

MAN.—The Subpermanent Region, as defined by Riley (Rep. U. S. Ent. Com., I, 1878), extends over the western part of this Province as far as Lakes Manitoba and Winnipegosis. The remainder of the Province as far east as Lake Winnipeg and the Lake of the Woods, is included in the Temporary Region.

SASK.—South of about latitude 53° this Province may be roughly divided into an eastern and a western half, the former belonging to the Subpermanent, the latter to the Permanent Region.

ALTA.—Practically the whole of this Province, to a little north of Edmonton, belongs to the Permanent Region.

B. C.—Greenwood, 1 ♀. (Alexander.) Also recorded from this Province by Bruner (Rep. U. S. Ent. Com., III, 60, 1883).

I have deemed it unnecessary to give a detailed list of localities in the case of this migratory species.

74. *Melanoplus devastator conspicuus* Scudder.

B. C.—Vancouver Id. (Caudell.³)

75. *Melanoplus Dawsoni* (Scudder).

MAN.—Aweme, Aug. 15, Oct. 2, 1907, 2 ♂'s. (Criddle.) Also recorded from the Red River (Scudder⁵), Portage la Prairie, Brandon, Carberry, Bergin, and between Souris and Boissevain (Walker).

SASK.—Yellow Grass, 1 ♂, 6 ♀'s. Weyburn, 2 ♂'s, 4 ♀'s. Vonda, 1 ♂. Kuroki, 3 ♂'s, 1 ♀. Condee, 1 ♂, 1 ♀. Langham, 3 ♂'s, 3 ♀'s. Moosomin, 4 ♂'s, 8 ♀'s. Kamisack, 1 ♂, 4 ♀'s. (Alexander.) Regina, Sept. 7, 1903, 1 ♂. (Willing.) Also recorded from the Souris River (Scudder²), Moose Jaw (Caudell¹), Chaplin and Parkbeg (Walker).

ALTA.—Ponoka, 1 ♀; Red Deer, 2 ♂'s; Medicine Hat*, 1 ♂, 1 ♀. (Alexander.) Also recorded from Macleod (Scudder⁵).

Macropterous specimens (*M. Dawsoni completus* Scudd.), included in the above list, have been received from Aweme (2 ♂'s), Yellow Grass (1 ♀), Moosomin (2 ♀'s), and Weyburn (1 ♀).

76. *Melanoplus Gladstoni* Scudder.

Syn.—*M. compactus* Scudd.

MAN.—Aweme, Aug. 12, 18, 1906, 3 ♂'s, 1 ♀; Aug. 12, 1907, 1 ♀; Aug. 30, 1907, 2 ♂'s, 1 ♀; Oct. 7, 1907, 1 ♂. (Criddle.) Also recorded from between Carberry and Neepawa (Walk.).

SASK.—Regina, Sept. 23, 1906, 1 ♀. (Willing.) Also recorded from Moose Jaw (Caudell³).

ALTA.—Medicine Hat, 6 ♀'s; Macleod, 1 ♀; (Alexander.) The Loop, Banff, Sept. 13, 1909, 1 ♀. Also recorded from Medicine Hat (Scudder⁵, Caudell³) and Calgary (Caudell³).

M. compactus is certainly, and *M. conspersus* probably, a synonym of *M. Gladstoni*.

77. *Melanoplus Washingtonianus* Bruner.

ALTA.—Summit of Sulphur Mt., near Banff, Aug. 23, 1909, 1 ♂, 3 ♀'s; the Loop, Banff, Aug. 16, 1909, 1 ♂, 1 ♀; Tunnel Mt., Sept. 4, 1908, 1 ♀. (Sanson.) Also recorded from Laggan by Caudell³, and from the same locality as *Podisma Dodgei* (?) by Walker.

78. *Melanoplus validus* Scudder.

B. C.—Nelson, 1 ♀. (Alexander.)

This specimen has pale red hind tibiae. The determination was confirmed by Mr. Caudell.

79. *Melanoplus fasciatus* (Walker).

MAN.—Point Wigwam, Lake Winnipeg. (Scudder¹.) Lake of the Woods. (Caulfield.)

SASK.—Kinistino, June 23, 1905, 2 ♀'s. (Willing.) Also recorded from the Pas, Saskatchewan River (Scudder¹) and the Souris River (Scudder²).

ALTA.—Banff, Aug. 5, 8, 22, 29, 1908, 1 ♂, 4 ♀'s; Aug. 11, 16, 1909, 1 ♂, 2 ♀'s; Sept. 13, 1909, 3 ♀'s. Slope of Mt. Rundle, Sept. 13, 1909, 1 ♂. Tunnel Mt., Sept. 4, Oct. 3,

1908, 2 ♀'s. Summit of Sulphur Mt., Aug. 21, 31, 1908, 2 ♀'s; Aug. 23, 1909, 1 ♀. Mt. Inglesmaldie, 6,000 to 7,000 ft., Sept. 11, 1908, 1 ♂, 3 ♀'s. (Sanson.) Also recorded from Laggan (Scudder⁵), Banff (Walker), and Edmonton (Fletcher²).

The only record of the macropterous form is the one from Edmonton. This form is common in northern Ontario.

80. *Melanoplus femur-rubrum* (De Geer).

MAN.—Winnipeg. (Scudder⁵.) Portage la Prairie and Brandon. (Walker.)

SASK.—Condee, 1 ♂; Findlater, 2 ♀'s; Pasqua, 1 ♂; Weyburn, 2 ♀'s. (Alexander.) Also recorded from Moose Jaw and Waldeck (Walker).

ALTA.—Ponoka, 1 ♀. (Alexander.) Walsh, Aug. 23, 1901, 3 ♂'s, 2 ♀'s. (Willing.) Also recorded from Medicine Hat (Caudell³).

B. C.—(Bruner¹, Scudder⁵.) Vancouver Id. (Scudder⁵.) Agassiz. (Walker.) Kaslo. (Caudell⁴.)

The specimens from the drier parts of Saskatchewan are considerably below the medium size.

81. *Melanoplus extremus* (Walker).

MAN.—Aweme, June 20, 1905, 1 ♂. (Criddle.) Also recorded from Plum Coulee (Walker) and Aweme (Fletcher²).

SASK.—Kinistino, June 23, 1905, 1 ♂, 1 ♀ (teneral). (Willing.)

ALTA.—Banff, July 22, 31, 1908, 2 ♂'s; Aug. 5, 28, 29, 1908, 4 ♂'s, 3 ♀'s. (Sanson.) Also recorded from Beaver Lake (Fletcher³) and Banff (Scudder⁵).

B. C.—Field. (Rehn.)

The only macropterous individuals in the series are two males from Banff.

82. *Melanoplus monticola* Bruner.

ALTA.—Mountains near Laggan. (Caudell³.)

83. *Melanoplus angustipennis* (Dodge).

MAN.—Aweme, July 19, 1904, 1 ♂; July 29, 1906, 1 ♀; Aug. 12, 1905, 1 ♂; Aug. 18, 1906, 1 ♂; Aug. 23, 1904, 1 ♂; Oct. 6, 1907, 1 ♂. (Criddle.)

The specimen taken Aug. 18, 1906, has blue hind tibiae, the others red. The red-legged individuals, commonly known as *M. coccineipes*, are certainly not distinct from the typical blue-legged form.

The specimens in this series are all of small size. Two of them are of an almost uniform pale reddish-brown colour.

84. *Melanoplus Packardii* Scudder.

SASK.—Regina (Caulfield), Moose Jaw (Caudell³), and Radisson (Rehn).

ALTA.—Medicine Hat, 4 ♀'s (Alexander); Oct. 1, 1903, 2 ♂'s, 2 ♀'s (Willing). Also recorded from Calgary (Caudell³).

B. C.—(Scudder⁵) Nicola Valley. (Walker.)

85. *Melanoplus fædus* Scudder.

SASK.—Swift Current Creek, Aug. 5, 1901, 1 ♀. (Willing.)

86. *Melanoplus infantilis* Scudder.

MAN.—Between Souris and Boissevain, and Brandon. (Walker.)

SASK.—Kamsack, 1 ♂. Weyburn, 4 ♂'s. Yellow Grass, 3 ♂'s. (Alexander.) Regina, Sept. 15, 1901, 1 ♂; Sept. 23, 1906, 2 ♀'s. Also recorded from Regina (Caulfield), Moose Jaw (Walker, Caudell³), vicinity of Chaplin and Parkbeg, Indian Head, and near Waldeck (Walker) and Rudy (Rehn).

ALTA.—Leduc, July 23, 1901, 1 ♂. Walsh, Aug. 23, 1901, 4 ♂'s, 1 ♀. (Willing.) Lethbridge, 1 ♂. Medicine Hat, 2 ♀'s. (Alexander.) Also recorded from Macleod (Scudder⁵), Calgary (Caudell³).

87. *Melanoplus minor* (Scudder).

MAN.—Aweme, June 21, 28, 1904, 2 ♂'s. (Criddle.) Also reported from Winnipeg by Scudder⁵.

SASK.—Rudy. (Rehn.)

88. *Melanoplus bivittatus* (Say).

MAN.—Bonito, Swan River District, Sept. 8, 1906, 1 ♀. Near Durham, Swan River District, 3 ♂'s. (Alexander.) Also recorded from Winnipeg and Lake Winnipeg (Scudder⁵), Lake of the Woods (Scudder²), and near Rosebank (Walker).

SASK.—Moosomin, 1 ♂. Condee, 1 ♀. Weyburn, 1 ♂. (Alexander.) Regina, Aug. 12, 1901, 1 ♀; Aug. 12, 1904, 1 ♀; Sept. 10, 1905, 1 ♂; Sept. 7, 1903, 1 ♂ nymph. Swift Current, Sept. 17, 1 nymph. Radisson, July 29, 1907, 1 ♀. (Willing.) Also recorded from Rush Lake (Walker), Moose Jaw (Caudell³), Rudy and Radisson (Rehn).

- ALTA.—Ponoka, 5 ♂'s, 11 ♀'s. Calgary, 1 ♀. (Alexander.)
Walsh, Aug. 23, 1901, 1 ♀. North of Olds, Sept. 13, 1902,
1 ♀. (Willing.) Also recorded from the Souris River
(Scudder²), Medicine Hat and Macleod (Scudder⁵),
B. C.—(Bruner, Rep. U. S. Ent. Com., iii, 1883.) Victoria
(Fletcher¹) and Vernon (Walker).

The only records of the red-legged form (*femoratus*) are from Lake Winnipeg, Calgary, Vancouver Id. and British Columbia. Both forms are recorded from Lake Winnipeg, Calgary and British Columbia.

89. *Phætalites Nebrascensis* (Thomas).

ALTA.—Walsh, Aug. 23, 1901, 1 ♀, brachypterous. Also recorded from Medicine Hat and Macleod (Scudder⁵).

90. *Asemoplus Montanus* (Bruner).

B. C.—Nelson, 1 ♀. (Alexander.) Also recorded from Vernon by Walker.

NOTONECTA UNDULATA SAY PREYING ON THE EGGS OF
BELOSTOMA (= *ZAITHA* AUCTT.) *FLUMINEUM* SAY.

BY HENRY H. P. SEVERIN AND HARRY C. SEVERIN.

A few undulating back-swimmers, *Notonecta undulata*, were placed as food material in a glass-jar of water containing a male specimen of *Belostoma flumineum* bearing eggs on its back. Several days later it was observed that the only surviving *Notonecta* was feeding in a righted position on the eggs, while the *Belostoma* was clinging quietly, back upward, to an object on the bottom of the jar. The back-swimmer was disturbed several times at its meal, but after swimming about for a short while it would again return to feed on the eggs. The interesting point of the observation was, that during the entire process of feeding, the *Notonecta* was always in a righted position.

THE Annual Meeting of the Entomological Society of Ontario will be held at the Ontario Agricultural College, Guelph, on Thursday and Friday, November 3rd and 4th.

NEW PARASITES OF THE GENUS MERAPORUS.

BY E. S. TUCKER,

Bureau of Entomology, U. S. Dept. of Agric.

In a small quantity of seed wheat obtained from the storehouse of a grain dealer at Plano, Texas, in July, 1907, two dead bodies of a Chalcid fly were found, together with a few specimens of the common grain weevil, *Calandra oryzae* L. These parasites were found to agree closely, but still doubtfully, with *Meraporus calandrae*, described as a *Pteromalus* by Dr. L. O. Howard in the Annual Report of the (U. S.) Commissioner of Agriculture for 1880, p. 273. On submitting the specimens to Mr. J. C. Crawford, at the U. S. National Museum, he reported that they belonged to the genus *Meraporus*, though the species was not *calandrae*. My parasite thus appeared to be undescribed, and it was consequently cited as a new species by Mr. W. D. Pierce in his paper entitled, "A List of Parasites Known to Attack American Rhyncophora" (Jr. Econ. Ent., I, Dec; 1908, p. 384).

The species is herewith described; type and paratype as mentioned are deposited in the U. S. National Museum.

Meraporus utilis, n. sp.

Female: Length, 1.5 mm.; head, thorax and abdomen steely black, clothed with extremely fine and sparse silvery pubescence, except on base of abdomen, and minute black bristles on occiput and dorsum of thorax; reticulately punctured on head, confusedly so on thorax; abdomen smooth-shining, venter strongly keel-shaped. Head transverse, wider than thorax, front slightly depressed medially for reception of antennal scapes, below with convergent striæ at oral margin; antennæ about as long as thorax, dull reddish, pedicel and flagellum, excepting first and second ring-joints, darkened above; ring-joints together about two-thirds the length of pedicel, first and second ring-joints small, but combined equal to length of third, which is slightly smaller than first funicular joint, the latter a little longer than wide, second to fifth funicular joints quadrate; club with widest expansion at juncture of first and second joints, tapering to a conical point with third joint. Ocelli arranged in a curve.

Thorax a little longer than wide, parapsidal furrows indistinct; metathorax punctured as on dorsum, tricarinate, the median carina short, the lateral ones sinuate and extending to posterior corner of the short metathoracic neck; lateral folds indicated by basal foveolæ only, spiracles very small, broadly oval; spiracular sulci very deep and distinct.

Tegulæ fulvous ; wing-veins yellow, ciliate, stigmal vein scarcely two-thirds the length of marginal or postmarginal ; legs yellow, excepting coxæ and last tarsal joint outwardly, which are black, the femora, tibiæ and tarsi about equal in length for each pair, the fore legs short in proportion with others.

Dissection of the mandibles of the paratype has shown each one to have four denticles, colour ferruginous with front edges darker.

Before attempting the above description, efforts were made to obtain a series of specimens representing both sexes, but all the other specimens obtained failed to agree with my first species. The additional specimens were not secured until the season of 1909, when a quantity of cracked corn and oats infested primarily by *Calandra oryzae* was obtained July 26, from the same grain house at Plano, Texas, where my first examples had been taken. This mixed grain had been gathered from scatterings on the floor, under the shelling and cleaning machinery, where it had lain for probably a month before being sacked and set aside for sale as chicken feed. The infested grain was placed in breeding crocks at Dallas, Texas, and adult parasites appeared within four days, further emergences occurring August 6, 7 and 9, September 11, October 16 and 18, November 23, December 16, and again on April 5, 1910; and at various times since. Although I had collected weevily grain from other sources in the hope of rearing this or the first species, only one female had been thus secured, and this specimen matured October 3, 1908, from an ear of corn infested by *Calandra oryzae*, which had been collected by myself ten days previously in a field near Shreveport, La. The species agreed with those of my second collection from Plano, Texas, and the record is important for proof of the occurrence of the parasite in fields where the host abounds, though, as might be expected, stored grain when infested by weevils naturally becomes a place of concentration of the enemy as with the host.

At the time my specimens were being studied, still other examples, comprising five females and one male reared from rice primarily infested by *Calandra oryzae*, which material was obtained by Mr. D. L. Van Dine in a rice mill at Welsh, La., August 2, 1909, were discovered to be identically the same parasite. The species is consequently named in honour of Mr. D. L. Van Dine, who furthermore submitted still other identical specimens which he had collected in similarly infested rice, and also on windows in rice mills at El Campo, Texas, June 22, and at Lake Arthur, La., July 29. His records add materially to a knowledge of the importance of the parasite and its distribution. These specimens are

included under the designation of paratypes for the following description, which is based on an examination of 40 females and 5 males. Types are deposited in the U. S. National Museum.

Meraporus Vandinei, n. sp.

Female : Head and thorax dark greenish, clothed with thin and fine silvery pubescence, a thick linear patch on each side of the metathorax ; abdomen smooth, shining greenish, thinly pubescent on apical segments, venter deeply keeled ; head transverse, somewhat wider than thorax, finely reticulated rather than punctured on occiput, front and cheeks, with convergent striæ at oral margin of middle face ; front above insertion of antennæ hollowed for reception of scapes ; mouth-parts ferruginous, each mandible with four denticles ; antennæ about as long as thorax, scape dull reddish ; flagellum dull reddish beneath, darker above, with fine silvery pubescence ; pedicel about twice the length of the three ring-joints together, but scarcely longer than the first funicle-joint, which appears distinctly longer than wide ; second and third funicle-joints slightly longer than wide, fourth and fifth quadrate ; club expanded at junction of first and second joints, the third forming a small conical tip. Anterior ocellus situated but little in advance of a median point between the posterior ones.

Thorax with fine shallow thimble-pitted punctures, contiguous and distinctly larger than on head ; length of thorax scarcely exceeds the width, parapsidal furrows very faint only on anterior half of mesonotum. Metathorax very finely punctured, with a median longitudinal carina ; metathoracic neck very short, smooth ; lateral folds indicated by basal foveolæ only, spiracles very small, broadly oval ; spiracular sulci very deep and distinct.

Tegulæ fulvous ; wing-veins yellow, ciliate, stigmal vein shorter than marginal or postmarginal by about one-fourth the length. Legs yellow, excepting the coxæ, femora in greater part between the base and apex, and last tarsal joint outwardly, which are dark brown or fuliginous. Tibiæ of middle and posterior legs little longer than femora or tarsi, which are about equal in length, but no noticeable difference in these respects with fore legs. Comparatively the fore legs are shorter than the others.

Type : Plano, Texas, July 26, 1909 ; emerged September 11.

Male : Antennæ with larger microscopical pits than with female ; the first and second ring joints very small and compressed, the third appears as the first joint of funicle, but is smaller and shorter than the true funicular joints. Abdomen hardly as long, or at most not longer than

thorax, almost flattened above, not deeply keeled ventrally, widest near apex, and with a dorsal fulvous area near base expanding to the lateral edges; otherwise agreeing with females.

Type: Plano, Texas, July 26, 1909; emerged August 6.

Paratypes show some variations of colour; the greenish tinge of head and thorax being stronger in some examples than others, and the flagellum is sometimes nearly or wholly black.

Length of female type and paratypes ranges from 1.25 to 2 mm.; male type and paratypes from 1 mm. to 1.5 mm.

A single specimen reared with *Vandinei* from same material collected by Mr. D. L. Van Dine at Welsh, La., August 2, 1909, represented another species, which is described as follows:

Meraporus requisitus, n. sp.

Male: Length, 1.25 mm.; resembling *Vandinei* and similarly punctured, but distinguished by blacker colour of body, and paler legs, including fore coxæ, the femora only dull brown; no metathoracic carina, nor fulvous area on base of abdomen; first and second funicle-joints little longer than wide, third to fifth subquadrate; left mandible with three denticles, but four on the right.

The genus *Meraporus*, as established by Francis Walker (Monographia Chalciditum, Ent. Mag., v. 2, 1834, p. 298), was accorded 12 antennal joints, but in Ashmead's classification, it is considered as having 13 joints of the antennæ. Walker very likely failed to distinguish more than two ring-joints. In fact, the entire three ring-joints, particularly of male examples, are difficult objects for clear definition even under a binocular with high power magnification.

Three previously described species of *Meraporus* have been recognized in the United States: *calandræ* How., has an asymmetrical denticulation, the right mandible with four denticles, and the left with three; *bruchivorus* Ashm., is readily known by the smooth lower face and cheeks, besides larger size; and *dubius* Ashm., although characterized by a tricarinate metanotum, is said to have strongly curved lateral folds, and subcosta nearly three times as long as the marginal vein.

The very helpful assistance of Mr. J. C. Crawford in the study of my specimens is gratefully acknowledged.

ECONOMIC LITERATURE CONSULTED.

1. Ashmead, W. H.—Descriptions of new parasitic Hymenoptera bred by Prof. F. M. Webster. (Ohio Agr. Exp. Sta., Bull., Tech. Ser., v. 1, No. 3, April, 1893, p. 161.)

Descriptions of *Neraporus bruchivorus*, reared from *Laria* (*Bruchus*) sp. in Kansas, and *Laria* (*Bruchus*) *exiguus*, in Iowa.

2. Chittenden, F. H.—A foreign parasite of the grain weevils. (U. S. Dept. Agr., Div. Ent., Bull. 8, n. s., 1897, pp. 43-45.)

Refers to *Pteromalus calandraræ* How.

3. Cotes, E. C.—A conspectus of the insects which affect crops in India. (Ind. Mus. Notes, v. 2, No. 6, 1893, p. 155.)

"*Pteromalus oryzae* Cameron.—A minute coppery-green coloured insect, believed to be parasitic upon the wheat and rice weevil (*Calandra oryzae*)."

4. Doten, S. B.—Department of Entomology. (Nev. Agr. Exp. Sta., Bull. 66 [An. Rept. for year ending June 30, 1908], Dec., 1908, p. 36.)

Reports *Meraporus*? sp. reared from larvæ of the codling moth.

5. Fernald, C. H.—Report on insects. (Hatch Exp. Sta. Mass. Agr. Coll., Bull. 19, May, 1892, p. 116.)

Mentions an undescribed species of *Meraporus* bred from pupæ of Gypsy moth. See correction in 7.

6. Fernald, C. H.—Entomologist's report. (Fortieth An. Rept. Mass. St. Bd. Agr., 1892 [1893], p. 297.)

Cites *Meraporus* sp.? from Gypsy moth pupæ. See correction in 7.

7. Fernald, C. H.—Entomologist's report. (Forty-second An. Rept. Mass. St. Bd. Agr., 1894 [1895], p. 261.)

Corrects the determination of species formerly cited as *Meraporus* sp.? which proved to be *Diglochis omnivorus* Wk.

8. Howard, L. O.—See reference in text. Description and breeding records of *Meraporus* (*Pteromalus*) *calandraræ*.

9. Pierce, W. D.—See reference in text.

10. Riley, C. V., and Howard, L. O.—Special notes. (Insect Life, v. 4, Nos. 11 and 12, Aug., 1892, p. 354.)

In review of Bull. 19, Hatch Exp. Sta. Mass. Agr. Coll., an undescribed species of *Meraporus* is mentioned as issuing from the pupa of the Gypsy moth. See correction in 7.

11. Riley, C. V.—The insects occurring in the foreign exhibits of the World's Columbian Exposition. (Insect Life, v. 6, No. 3, Feb., 1894, p. 223.)

Cites *Meraporus* (?) sp. in sheaf grain, "badly infested with *Gelechia cerealella*"; another species recorded as "parasite of *Bruchus 4-maculatus* from Brazil"; one other species at large.

12. Smith, J. B., and Ashmead, W. H. Order Hymenoptera. Insects of New Jersey. (Supp. 27th An. Rept. St. Bd. Agr. N. J., 1899 [1900], p. 558.)

Cites *Meraporus calandrac* How. "Should occur in New Jersey."

A NEW SPECIES OF JAPANESE MICRO-LEPIDOPTERA.

BY W. D. KEARFOTT, MONTCLAIR, N. J.

A pair of specimens of the species herewith described were sent to me by Dr. John B. Smith, the latter part of May, with the statement that they had been bred from larvæ found on young hemlock trees, recently imported from Japan by a nurseryman in this State. As the species was unknown to me and of a distinctly Oriental appearance, I sent a male to Dr. Edward Meyrick, Marlborough, England, the authority on Eastern Lepidoptera. Dr. Meyrick was good enough to make a prompt reply, stating that the species was undoubtedly referable to his genus *Ptochoryctis*, of which he has already described five others, all from Indian regions, and that the nearest allied genera, *Methathrinca* and *Linoclostis*, are also only known from India and the Malay Archipelago, hence he did not doubt that this species is truly Japanese. Dr. Meyrick also stated that the species nearest to it is *P. simbleuta* Meyr., the larvæ of which are brick-red, and feed beneath a web, covered with refuse and pieces of bark, on bark and shoots of tea-plants (*Thea*), eating right through to the cambium, and thus killing the branch or plant. (Journal Bombay Natl. Hist. Soc., XVIII, 150, 1907.)

This letter was duly communicated to Dr. Smith, and he was good enough to forward fourteen other specimens, together with notes, larvæ, cocoons or cases and pupal shells, from all which the following description was made:

The larvæ were taken April 5th, in cocoons or larval-cases, larvæ all alive at this date, first pupa observed May 4th.

My belief is that the cocoons in which the larvæ pupated are larval-cases, making the habit similar to *P. simbleuta*. The case is of rather tough silk, thickly covered with pellets of dried frass, hemlock-needles and other refuse, lightly fastened to the twigs and apparently fairly well concealed in a cluster of needles. The cases are 10-15 mm. long, by 5-6 mm. in diameter. Pupal shell remains within the case when moth emerges.

As it is quite possible that other shipments of hemlock from Japan may be infested with this species, it might be well for State entomologists and nurserymen to be on the lookout for its appearance. The moth is

not unlike *Crambus elegans*, and of the general appearance of *Stenoma schlagerei* and some of the whitish *Ethmias*. If it can readily be controlled it would be a very interesting and handsome addition to our fauna.

Family XYLORYCTIDÆ.

Genus PTOCHORYCTIS Meyrick.

Trans. Ent. Soc. London, p. 19, 1894.

"Head with appressed scales, side-tufts loosely spreading; ocelli present; tongue developed. Antennæ $\frac{3}{4}$, in male bipectinated, towards apex simple, basal joint stout, without pecten. Labial palpi long, curved, ascending, with appressed scales, terminal joint shorter than second, acute. Maxillary palpi rudimentary. Posterior tibiæ clothed with long hairs.

Fore wings with vein 1b furcate, 2 from 4 $\frac{1}{2}$, 7 and 8 stalked, 7 to hind margin, 9 absent, 11 from beyond middle.

Hind wing 1, trapezoidal-ovate, hind margin sinuate, cilia $\frac{1}{2}$, veins 3 and 4 short-stalked, 6 and 7 approximated towards base.

Nearly allied to *Cryptophasa*.

Type of genus and only species described in this paper, *P. eremopa* Meyrick.

Habitat.—Koni, Upper Burma."

Ptochoryctis tsugensis, new sp.—♂—♀. Expanse, 21–24 mm.

Head, thorax and labial palpi cream-white, latter dusted with fuscous at base; stalk of male antennæ cream-white, narrowly fuscous between joints; pectinations fuscous, basal joint shining greenish-fuscous; female shining fuscous, faintly annulated with white. Abdomen cream-white, posterior upper half of each male segment cupreous; legs cream-white, first pair heavily overlaid with shining fuscous, middle pair heavily dusted with fuscous on tibiæ and tarsi, posterior pair but lightly speckled, spurs all dusted, heaviest at apices.

Fore wing shining white, marked with fuscous as follows: Over upper vein of cell, from just beyond base to end of cell and continuing over vein 6 with branches 7 and 8, with a faint scattering of dark scales over 10 and 11. The lower vein of cell, from middle, is heavily overlaid with the dark colour, spreading over veins 2 to 5, the interspaces being more or less white. Vein 1b from beyond base to tornus. The extreme base of wing is pure white, except costa, narrowly edged with fuscous to inner $\frac{1}{3}$. A dark subterminal line begins at outer sixth of costa, curves outward to vein 6, thence inward to tornus, paralleling margin, over each vein the colour is darker. Between this and cilia the terminal space is

overlaid with a lighter shade of cupreous-fuscous, forming a continuous terminal line, but inward interrupted by white spots between the veins. Cilia white at base, through which runs a fine dark line, outwardly lighter shining fuscous.

Hind wing whitish-yellow, cilia white, with faint median line; under side fore wing shining light fuscous, slightly darker over veins; hind wing yellowish-gray, slightly darker over veins 7 and 8.

Variation: Description is from average specimens; the amount of dark scaling is not uniform, in some specimens the dusting is much heavier, nearly filling the interspaces, especially beyond and below cell, in others the dark scales are absent, except on the veins, but in all the pattern is maintained as per the description.

Described from 8 males and 8 females bred from larvæ on a Japanese species of hemlock, *Tsuga sieboldi*, at a nursery in New Jersey; issued May 7 to 23. A pair of co types deposited in U. S. Natl. Mus., N. J. Agric. Exp. Sta., Meyrick collection, the balance in Kearfott collection.

Larva full-grown, from alcoholic specimen.

Fourteen mm. long, 2.5 mm. diam. at 1st abdominal segment. Cylindrical, slightly tapering from 1st abd. to anal segment. Head blackish-brown, flattened in front, rather square on top; clypeus triangular, reaching only half way to vertex; epistoma paler; antenna concolorous. Prothoracic shield large, concolorous with head, bisected by paler dorsal line, two tubercular plates below large and brown. Body cream-white, speckled with pink, the pink specks are in a double dorsal line, a subdorsal line, a subspiracular line and a line above the feet, also a less distinctly defined ventral line. The subdorsal line is darker and better defined than the others. Tubercles prominent, pinkish-brown. Setæ moderate, pale. Anal shield large, yellow, speckled lightly with pale brown. Thoracic feet blackish-brown, annulated with whitish; abdominal feet moderate, normal, the crochets in complete ellipse.

Pupa, 8 x 2 mm., slightly flattened, light brown, darker on dorsum. Frontal shield similar to Tortricid pupa. Cremaster broad laterally, with two outer and two middle very short hooks.

Examples of this larvæ were submitted to Prof. W. T. M. Forbes, who has written description which will follow. In a letter, Mr. Forbes states:

"The caterpillar shows some curious likenesses to *Endrosis lacteella*, such as the form of the front and surrounding parts. There seems to be also a suggestion of the curious slit-like marks on the labium. On the other hand, the setæ on the prolegs are unique, so far as I have seen, and so is the double ring of tubercle iii. Can it use setæ iii in travelling, and so need a more complex joint for them than other caterpillars have?"

Mailed October 7th, 1910.

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No. 11

A NEW AUTOGRAPHIA FROM THE ALBERTA ROCKIES.

BY F. H. WOLLEY DOD, MILLARVILLE, ALTA.

Autographa Sansoni, n. sp.

Head and thorax rich olive-brown, all the crests and ridges tipped with violaceous. Abdomen dark ochreous, densely shaded posteriorly with fuscous and gray, with pinkish lateral tufts, and an anterior dorsal crest of colour of those on thorax. Ground colour of primaries of the same violaceous tint as the crest tips, shaded and reticulated with olivaceous and velvety blackish-brown, the darkest shades being in central area below the median vein, the basal and inner subbasal spaces, and a subterminal shade near apex. Basal line from costa to vein 1 nearly straight, and nearly at right angles to median vein, to which point it is double, dark-filled, the inner portion metallic, thence single. T. a. line single, metallic, sharply dentate outwardly below costa, outcurved below median vein, bordered anteriorly by a narrow dark olivaceous-brown shade, which is preceded by a narrow shade of the pale ground. T. p. line paler than ground, but scarcely metallic, except on inner margin and just below vein 2, narrowly bordered both sides by dark brown, distinct throughout its length, outcurved and slightly sinuate from costa to vein 5, almost direct to vein 2, thence slightly sinuate to inner margin. S. t. line defined by pale space between subterminal and terminal shades, undulate, with an inward sinus below vein 2. The preceding shade is dark olivaceous, shading into metallic-green between 1 and 3, blackish between 3 and 6. A pale line at base of fringes, preceded and followed by dark lunules, the anterior row being divided from the preceding olivaceous terminal area by a fine pale line. Fringes cut with dark opposite veins.

Spots finely outlined with metallic-silver, about of *californica* and *pseudogamma* pattern. Sign silvery-metallic, consisting of two lines running obliquely downwards and outwards from median vein just below reniform, coalescing at about a third of their length, and continued as a broad line slightly upcurved, of even width, blunt at extremity, almost reaching the t. p. line just below vein 2. There is a pale fulvous patch extending from just below the junction of sign to the t. p. line.

Secondaries pale lemon-yellow, with a short discal spot and a very broad blackish outer border. A fine yellow terminal line, followed by a blackish line at base of the yellow fringes, which are cut with blackish opposite veins. Beneath ochreous, densely shaded with fuscous, darkest in subterminal space, with terminal and subapical shades of olivaceous brown. The sign is reproduced in pale lemon-yellow. A small dark discal spot on secondaries.

Expanse, 35 mm. = $1\frac{3}{8}$ inches.

One perfect male, Banff, Alta., June 10th, 1910, "Imperial Bank," N. B. Sanson. Presented by him to the U. S. National Museum.

The specimen was captured, probably at light, at a low level, about 4,600 ft., and was received as No. 159, amongst some other specimens for naming. Sir George Hampson has seen it, and says that it has no nearer relation in the Old World than *P. Hochenwarthi* Hoch., from which it is very distinct.

In pattern of primaries it closely resembles *rubidus* Ott., in which the sign varies to almost exactly the sign here described. It agrees in wing form. In colour *Sansoni* is far richer, with stronger contrasts. The lines are less oblique, and though the t. a. is rather more curved, the t. p. is more direct, and is distinct throughout its length. The orbicular is smaller and narrower. The patch below the sign, which is pale fulvous in *Sansoni*, is greenish-golden in *rubidus*. In the secondaries it differs still more strikingly from *rubidus*, in having them of the pale lemon-yellow of *orophila* Hamps. and *diasema* Bdv., but with cleaner base and still broader black border than any of my specimens of these. It in no way resembles either of them as to primaries.

The species falls in *Autographa* Hubn., as characterized by Dr. Dyar in Journ. N. Y. Ent. Soc., X, 80, 1902; and like *rubidus*, which I consider its nearest ally, has not spined tibiæ. In all the other yellow-underwinged Plusiids known to me the hind tibiæ are strongly spined, and tibial spines exist also in several other species at present standing under *Autographa*.

DURING a fortnight's vacation spent at Fortune's Rocks, near Biddeford, Maine, at beginning of July, the following species of Lepidoptera were attracted to lights on the hotel gallery: *Smerinthus cerysii*, *Lapara bombycoides*, *Apantesis virguncula*, *Fagitana littera*, *Capis curvata*, *Datana major*, *Cochlidion biguttata*, *Caripeta angustiorata*. A couple of specimens of *Hemaris gracilis* were taken at the flowers of the Sheep-laurel (*Kalmia angustifolia*).—A. F. WINN, Westmount, Que.

THE ORTHOPTERA OF WESTERN CANADA.

BY THE EDITOR.

(Continued from page 340.)

Family LOCUSTIDÆ.

Subfamily Phaneropterinæ.

91. *Scudderia pistillata* Brunn.

MAN.—Aweme, Aug. 26, 1904, 1 ♂. (Criddle.) Also recorded from Winnipeg by Scudder (Pr. Am. Acad. Arts Sc., XXXIII, p. 277, 1898).

SASK.—Regina, Aug. 11, 1902, 1 ♂; Aug. 16, 1903, 1 ♀. (Willing.) Aug. 14, 1906, 1 ♂. (J. A. Reid.)

92. *Scudderia curvicauda* (De Geer).

MAN.—Aweme, Sept. 15, 1907, 4 ♂'s. (Criddle.)

Subfamily Conocephalinæ.

93. *Orchelimum Manitobense*, n. sp.

Nearly allied to *O. vulgare*; but differing in the smaller head, shorter pronotum, shallower elytral sinus, longer tooth borne by the male cerci, and less distinct brown stripe on the head and pronotum.

Male: Size a little smaller than *O. vulgare*; head of moderate size, fastigium of the vertex slightly elevated, somewhat less broadly rounded in profile than in *vulgare*, the apex well rounded, almost as broad as the base of the first antennal joint, without a depression above, narrowed below where it comes in contact with the fastigium of the face. Eyes of the same relative size and prominence as in *vulgare*; antennæ about three times as long as the hind femora. Pronotum rather short, feebly flaring in front, anterior margin subtruncate, posterior margin broadly arcuate. Disk nearly flat, principal sulcus distinctly impressed, metazona nearly two-thirds the length of the prozona, faintly punctate, with a shallow depression on each side of the middle line; lateral angles distinct only on the metazona, well rounded. Depth of lateral lobes about equal to their length



FIG. 17.—*O. Manitobense* male, head and pronotum.

opposite the lower margin of the eye; ventral margin rotundo-rectangulate, elytral sinus very shallow, the margin beneath it gently and evenly arcuate; convex callosity as in *vulgare*. Tegmina surpassing the hind femora by about half the length of the latter, considerably inflated in the proximal half, as in *vulgare*,



FIG. 18. *O. Manitobense* male. dorsal view of head, pronotum and tympanum.

tapering distally to the narrowly rounded apices. Tympanum well developed, the principal vein strong, a little longer than in *vulgare*. Wings extending beyond the apices of the tegmina by 2-3 mm. Hind femora without spines beneath. Posterior margin of last dorsal segment broadly arcuate in dorsal view,



FIG. 19. — *O. Manitobense* male. last dorsal segment and right cercus.

with a minute median notch. Cerci equal in their proximal half, tapering distally to a blunt point, the outer margin straight; tooth on the inner face arising a little beyond the middle, at an angle of about 70° , horizontal, slender, tapering, somewhat recurved, fully half as long as the cercus. Subgenital plate large, shaped as in *vulgare*, the posterior margin obtus-angulately excavated, the styli larger than in *vulgare*.

Colour: Pale dull green; a somewhat broken brownish median band from the fastigium to the principal sulcus of the pronotum, in one individual distinct only at the lateral margins near the sulcus. Tegmina with a dark brown basal humeral streak extending to the principal vein of the tympanum, and another smaller spot of the same colour at the postero-lateral corner of the tympanum.

Female unknown.

Measurements: Length of body, 17; pronotum, 4.3-4.7; tegmen, 20-23; hind femur, 12-13 mm.

MAN.—Ashdown, July 29, 1910, 2 ♂'s. (Criddle. Type coll. Walker.)

94 *Xiphidion fasciatum* (De Geer).

MAN.—Carman, 1 ♀. (Alexander.) Aweme, July 30, 1909, 1 ♀; Aug. 9, 16, 1907, 3 ♂'s; Aug. 24, 1905, 1 ♂. (Criddle.)

Also recorded from the Red River (Scudder¹)* and Boissevain (Walker).

B. C.—Agassiz. (Walker.)

95. *Xiphidion brevipenne* Scudd.

MAN.—Red River. (Scudder.¹)

96. *Xiphidion saltans* Scudd.

MAN.—Aug. 8, 21, 1905, 2 ♀'s. (Criddle.)

SASK.—Souris River. (Scudder.²)

Both of the Manitoba specimens are brachypterous, the tegmina being shorter than the pronotum.

Subfamily Decticinae.

97. *Neduba carinata* Walk.

B. C.—Wellington. (Caudell.²)

98. *Apote notabilis* Scudd.

B. C.—Vancouver Island. (Caudell.²)

99. *Anabrus simplex* Haldeman.

MAN.—Aweme, July 15, 1904, 1 ♀ (Willing); Aug. 10, 1903, 1 ♂ (Criddle). Also recorded from Manitoba by Scudder (Psyche, VIII, p. 95, 1897).

SASK.—Radisson, July 29, 1907, 1 ♀ nymph. Also recorded from the Souris River by Scudder.²

var. *maculatus* Caudell.

B. C.—Ft. Walsh. (Caudell.²)

var. *coloradus* Thomas.

MAN.—Thomas (Bull. U. S. Geol. Surv. Terr., IV, p. 485, 1878).

ALTA.—Macleod. (Caudell.²)

The female from Aweme is rather small for the typical form (pronotum 11 mm.), and has faint indications of maculations.

100. *Anabrus longipes* Caudell.

B. C.—Nelson, 2 ♂'s. (Alexander.)

*Small numerals following an authority's name refer to same numerals in the list of references.

101. *Idionotus brevipes* Caudell.

MAN.—Aweme, July 26, 1906, 1 ♂; Aug. 1, 1904, 1 ♂; Aug. 17, 1905, 2 ♂'s. (Criddle.)

ALTA.—Calgary. (Caudell.²) Millarville. (Fletcher.³)

The specimen recorded from Calgary "was actually taken between Midnapore and Millarville, and about ten miles south of Calgary." (Fletcher.)

102. *Steiroxys borealis* Scudd.

ALTA.—Macleod. (Caudell.²)

Subfamily Stenopelmatinae.

103. *Stenopelmatus Californicus* Brunn.

B. C.—Vancouver (Brunner, Verh. zool. bot. ges. Wien, 1888, p. 211).

104. *Stenopelmatus longispina* Brunn.

B. C.—Vancouver (Brunner, *loc cit.*, p. 260-261).

105. *Cyphoderris monstrosa* Uhler.

ALTA.—Banff, Aug. 21, 1900; 1 ♀. (Sanson.) Also recorded from this locality by Scudder (CAN. ENT., XXXIII, p. 17, 1901), Caudell (Journ. N. Y. Ent. Soc., XII, p. 52, 1904), and Walker, from Laggan by Scudder (Psyche, IX, p. 167, 1901), and from the Saskatchewan River, below junction of North Fork, by Rehn.

B. C.—Peachland. (Fletcher.³) Ainsworth. (Caudell, *loc. cit.*)

106. *Ceuthophilus gracilipes* Scudd.

MAN.—Red River. (Scudder.⁴)

107. *Ceuthophilus terrestris* Scudd.

MAN.—North Red River. (Scudder.⁴)

108. *Ceuthophilus aridus* Bruner.

SASK.—Swift Current, Sept., ♂, ♀. Regina, May 24, July 16, 1904; May 7, 1905; June 17, 20, 1907; Sept. 7, 1903, 6 ♂'s, 4 ♀'s (all immature). Mortloch, Nov. 20, 1907, 1 ♀ nymph. (Willing.)

These specimens agree closely with Bruner's description of Colorado individuals, except that the mature pair from Swift Current measure considerably larger, and are not quite uniform

in coloration as described for *aridus*, though very nearly so. They measure as follows :

Length of pronotum, ♂ 5, ♀ 4.5 ; fore femur, ♂ 6, ♀ 5.5 ; hind femur, ♂ 13, ♀ 11.5 ; hind tibia, ♂ 14, ♀ 13 ; ovipositor, 10 mm.

109. *Ceuthophilus celatus* Scudd.

B. C.—Victoria. (Scudder, CAN. ENT., XXXI, p. 118, 1899.)

110. *Ceuthophilus Agassizii* Scudd.

B. C.—Vancouver Island and "British Columbia." (Scudder.⁴)

111. *Ceuthophilus Californianus* Scudd.

B. C.—Vancouver. (Walker, Cat. Derm. Salt. Brit. Mus., 1, 202, 1869.) Victoria. (Fletcher.¹)

112. *Ceuthophilus Henshawii* Scudd.

B. C.—Vancouver Island. (Scudder.⁴) Kaslo. (Caudell.⁴)

113. *Udeopsylla nigra* Scudd.

MAN.—Aweme, Aug. 31, 1904, 1 ♀ ; Aug. 31, Sept. 12, Oct. 4, 1905, 2 ♂'s, 2 ♀'s ; Aug. 30, 1906, 1 ♀ ; July 13, Aug. 20, Sept. 28, 1907, 2 ♂'s, 2 ♀'s. (Criddle.) Deloraine, July 27, 1904, 1 ♂. (Dr. J. M. David.) Elgin, Aug. 14, 1899, 1 ♂. (D. Gibson.) Also recorded from the Red River (Scudder¹).

These specimens vary from pale chestnut-brown to black, but it is impossible to separate them into two species, although the brown individuals do not seem to differ from *U. robusta* Scudd.

Family GRYLLIDÆ.

Subfamily Myrmecophilinæ.

114. *Myrmecophila Oregonensis*.

B. C.—Victoria. (Fletcher.¹) Vancouver. (Taylor, Ott. Nat., XII, 59, 1898.) Wellington, Vanc. Id. (Caudell.³)

Subfamily Gryllinæ.

115. *Nemobius fasciatus abortivus* Caud.

MAN.—Aweme, Aug. 8–31, 1904, 6 ♂'s, 12 ♀'s ; Aug. 24, 25, 1905, 4 ♂'s, 4 ♀'s, 2 nymphs ; Sept. 25, 1904, 1 ♂ ; Sept. 20, 1907, 1 ♀ ; Nov. 3, 1904, 1 ♀. (Criddle.) Elkhorn, 1 ♀. (Alexander.)

SASK.—Yellow Grass, 1 ♂; Moosomin, 1 ♂, 1 ♀; Vonda, 1 ♀. (Alexander.) Also recorded from Moose Jaw (Caudell^{1,3}).

ALTA.—Medicine Hat and Calgary. (Caudell³)

The series from Aweme is very interesting, showing great variation in colour, and length of tegmina and ovipositor. Some individuals approach *N. maculatus* Blatchl., from Indiana, in all these characters, and are scarcely distinguishable except by the longer and more numerous hairs of the pronotum, but, as a rule, the ovipositor is distinctly longer than in *N. maculatus*.

116. *Gryllus Pennsylvanicus* Burm.

MAN.—Aweme, May 26, 1906, 1 ♂; June 2-24, 1904, 3 ♂'s, 1 ♀; June 12, 1907, 1 ♂; Aug. 27, 1904, 1 ♀. (Criddle.)

SASK.—Moose Jaw. (Caudell.¹)

B. C.—Victoria, Vancouver. (Scudder, Psyche, IX, p. 269, 1901).

var. *abbreviatus*.

MAN.—Aweme, Aug. 8, 19, 26, 1904, 1 ♂, 2 ♀'s. Also recorded from the Red River (Scudder, Psyche, IX, p. 292, 1902).

B. C.—Near Victoria. (Walker.)

Of the four females from Aweme, the two which I have placed under var. *abbreviatus* are somewhat smaller than typical examples of this form, but the ovipositor is relatively quite as long as in the latter. The specimen taken in June is decidedly of the *Pennsylvanicus* type, while the fourth one is about intermediate between these two varieties.

The following measurements show the relation between the length of the ovipositor and hind femora in these four specimens:

Date of capture.	Length of ovipositor.	Length of hind femora.
Aug. 19	19	11
" 26	17.5	11
" 27	15.5	9.75
June 2	11.5	9

Subfamily *Œcanthinae*.

117. *Œcanthus nigricornis quadripunctatus* Beut.

MAN.—Aweme, Aug. 10, 1904, 2 ♂'s; Aug. 28, 1904, 1 ♀; Sept. 16, 1904, 1 ♀; Aug. 21, 26, 1909, 2 ♀'s. (Criddle.)

A NOTE ON THE LIGHT-EMISSION OF SOME AMERICAN LAMPYRIDÆ.

BY F. ALEX. MC DERMOTT, WASHINGTON, D. C.

In connection with the collection of specimens for some work on physiologic light, I have had occasion to observe the modes of light-emission of some species of American Lampyridæ common in this neighbourhood (Washington, D. C.), and thought that some of these might be of interest. The species most common here, at least within the city limits, is *Photinus pyralis* Linn.; *Photinus consanguineus* Lec., *Photinus scintillans* Say, *Photuris pennsylvanica* Geer, and *Lecontea (Pyractomena) angulata* Say, were also observed. Each of these species appears to emit its light in a different and characteristic way—sometimes in several ways.

The insect whose light-emission is best known here is the *Photinus pyralis*. This is the insect which abounds in our parks during the summer, and with whose peculiar “dipping” flight as it flashes most of us Washingtonians are familiar. This dipping flight is indulged in by the male, apparently while seeking its mate, and consists usually of a short downward flight, followed by a longer upward flight, during the whole of which the insect emits a continuous light, the whole phenomenon occupying from half a second to a second. The light appears to be at its maximum brilliancy during the turn at the lowest point of the flight, increasing rapidly on the descending flight, and decreasing on the ascending. At the completion of the flash the insect remains dark for some seconds, or perhaps minutes, and then repeats the operation, either near the same locality, or after a flight to some point usually not far from its starting point. Sometimes the light does not entirely die out immediately after the flash, but a phosphorescent glow is left shining for some seconds, sometimes till the next flash—and by this residual glow the insect may be trailed with ease at night. Later in the evening the insects fly higher, and then flash when flying straight, or, indeed, in any direction; the dipping flight appears to be indulged in only when near the earth. Occasionally they flash near the earth when flying in a curve the reverse of that described, that is, a rising flight followed by a descending one; rarely, also, they may be observed to twinkle, as will be described for the *Photuris*.

This description applies only to the male *pyralis*. The luminous organ of the male of this species occupies the entire ventral surface of the two abdominal segments next to the last, as well as a good portion, almost half, of the preceding segment. The luminous organ of the female occupies only a small spot, about a third of the ventral area, of the third

abdominal segment from the end. Although with apparently as strong wings as the males, they are heavier bodied, especially when pregnant, and fly comparatively slowly and for short distances, and their organ gives much less light than that of the male, though of the same quality, greenish-yellow. Both the male and female of this species have two small luminous points on the last abdominal segment; these points frequently present a continuous faint glow when the rest of the organ is dark, but they do not appear to be involved in the normal flash of the insect.

The larva of the *pyralis* is a narrow, sluggish glow-worm, and emits light from the ventral side of the next to the last abdominal segment. The lower side of the thoracic segments and the edges of the abdominal segments show the pink coloration characteristic of the thorax of the imago. In walking it pushes itself along with the end of the abdomen, as described below for the larval *pennsylvanica*; the *pyralis* larva, however, does not appear to have acquired the aquatic habits of the *pennsylvanica*, although it may be found in company with the latter glow-worm, in moist earth along the edge of roadways and paths.

After the *pyralis*, the most common Lampyrid here is the *Photuris pennsylvanica* Geer. This insect appears a little later in the evening than the *pyralis*, and may frequently be noticed flitting around trees and bushes just after sundown. It is usually easily distinguished from the *pyralis* by its different mode of light-emission, and the more greenish (or bluish) quality of its light. It is a much more active insect than the *pyralis*, with longer legs and a harder covering; both sexes are winged and equally active. In both sexes the luminous apparatus occupies the ventral sides of the two segments of the abdomen next to the last, and apparently a portion of the dorsal side also, since the light may be seen through the slight gap between the elytra when the insect is viewed from above. The female appears to give a slightly less intense light; at least, in mating, one insect is usually to be observed to be less brilliant than the other. The males are fighters, and on several occasions, when two or more have been imprisoned in a test-tube together, they have been known to kill one another, the insect killed being partially dismembered and the ventral portion of the thorax torn out.

The larvæ of *Photuris pennsylvanica* are broad, flat, sluggish glow-worms, rather resembling the common wood-lice; they carry two small points of light on the next to the last segment of the abdomen, and when walking push themselves along with the end of the abdomen. About one-third of the apparent width of the larva consists of broad, translucent,

horny plates, which extend outward from either side of each segment. These larvæ (*pennsylvanica*) appear to be semi-aquatic in habit; at this time of the year (early Sept.), while walking along the edge of Rock Creek, in Rock Creek Park, Washington, D. C., numerous points of greenish light, which glow slowly and then die out slowly, to glow again in a moment or so, may be seen at the very edge of the water; on investigation these proved to be the larval forms of the *Photuris* clinging to moist stones, weeds, etc., and presumably preying upon the smaller living things there. I noticed one quite remarkable sight; looking over a bridge which spans the creek just above a dam, one could see several of these points of light apparently on the surface of the water, and within a radius of about five feet, glowing and dying out again in their characteristic manner; upon closer observation there appeared to be at least a hundred of these larvæ thus apparently floating. The current here is slow, but perceptible, and as the mass of points of light did not change their position either with relation to each other or with the bridge, they must have been clinging to grasses or stones at the surface of the water. When compared at night in the same tube, the light of the larva of *pennsylvanica* is distinctly more greenish than that of the larva of *pyralis*.

The first time I saw the *pennsylvanica* in this neighbourhood, they were flitting around the tops of some rather high trees, the flight being in no particular direction. As seen there, they flashed with greater frequency than the *pyralis* ordinarily does, and the flash, instead of being a single prolonged emission, as in the latter insect, consisted of a series of several short, brilliant flashes, which may be best described as a "twinkling." This twinkling has often been observed since, and appears to be one of the methods of light-emission most commonly indulged in by this species.

Since this first observation, however, the *pennsylvanica* has been observed to emit light in several other characteristic ways. The most common of these, and probably the most common mode of light-emission of this insect, consists of a single prolonged flash, about as long in duration, and about as frequently repeated as the dipping flush of the *pyralis*, delivered while the insect is flitting around bushes and the branches of trees. The flash differs markedly from that of the *pyralis*. It begins as a faint glow, rapidly increasing in brilliancy, until it attains an intensity obviously much greater than that of the illumination of the commoner insect. It then ends suddenly, leaving an impression on the retina similar to, but of course much less intense than that produced by a sudden flash of lightning observed at night. As the maximum intensity of the light is

approached the speed of flight appears to diminish, and as the final point is reached the insect flies very slowly in a small rising helix, or, if flying straight, may come to an almost complete stop. Occasionally the flash is followed by a residual phosphorescence, similar to that observed with the *pyralis*, and rather more rarely the flash is not ended suddenly, but allowed to fade out more gradually, in a manner resembling the normal flash of the *pyralis*.

Another natural mode of light-emission of this insect consists of a single, momentary bright flash, lasting only a small fraction of a second, and delivered without respect to location or manner of flight; these flashes are apparently isolated instances of the flashes emitted by the insect when in captivity, as will be described, or of the last natural mode of light-emission which I have noticed. This last method, which I have observed only three times, consists of a vertical drop or fall of several feet—about ten feet in each of the three cases noted—during the whole course of which the insect is flashing rapidly. On the third occasion on which I noticed this falling flight, the insect continued to flit around the weeds near which he had dropped, still flashing rapidly.

In captivity the *pyralis* soon loses its luminous propensity, and attains a quiet, slow-creeping condition, in which it gives no light, or only occasional flashes. The *pennsylvanica*, however, is very restless when in captivity, running rapidly around his prison, and flashing almost continuously at intervals of about a second, these flashes never reach the full brilliancy of the natural convulsions of the insect, but are still quite bright.

The males of *Photinus consanguineus*, *P. scintillans* and *Lecontea angulata* all emit their light in short, bright flashes, apparently without relation to their manner of flight. The *angulata* emits two such flashes, separated by a fraction of a second's interval, followed by a longer interval before the next two. The *consanguineus* usually emits a single flash, much shorter and more sudden than that of the *pyralis*, sometimes followed by a residual phosphorescence, similar to that of the *pyralis*; occasionally, too, I have seen them give a twinkling light, suggestive of the *pennsylvanica*. The males of both of these species were first captured under the impression that they were the *pennsylvanica*, only the light being observed before capture. In both of these species the luminous organ of the male is confined to the ventral surfaces of the two abdominal segments next to the last. I have not yet captured a living female of the *consanguineus*; the female of the *angulata* has an organ of irregular shape, situated on the ventral surfaces of the same segments as in the male; the

light must be less intense than that of the male, but I have not observed them at night. In the cyanide killing-bottle the organ of the female *angulata* shines as four luminous points. The light-emission of the male *scintillans* is very similar to that of the *pyralis*, but shorter in duration, and not delivered during a dipping flight, but when flitting irregularly around bushes, etc. In appearance and location of the light-organ the male *scintillans* is a diminutive male *pyralis*, and from Watasé's drawings the female *scintillans* much resembles the female *pyralis*.

Dr. Frederick Knab (CAN. ENT., 1905, Vol. 37, pp. 238-239) has mentioned the difference in quality between the light of *Photinus scintillans* and *Photuris pennsylvanica*, and Turner (Psyche, 1882, Vol. 3, p. 309), has called attention to the similarities and differences between the light of *Photinus pyralis*, *Photuris pennsylvanica* and *Pyrophorus noctilucus*. Aside from the fact that the *pennsylvanica* is a considerably larger insect, and, therefore, with a larger luminous apparatus, there is certainly a distinct difference in the light. I have never submitted the light of *scintillans* to analysis with a spectroscope, but I have compared the light of *pyralis*, *pennsylvanica* and *consanguineus* with a small Schmidt & Häensch spectroscope, having an arbitrary numerical scale reading from 0 in the red (the lower end of the visible spectrum) to 65, the end of the visible violet, and on which the sodium D-line corresponds to No. 13, and the calcium lines H₁ and H₂ to 56.5 and 58.5 respectively. This little instrument resolved the light of the *pyralis* into a continuous band, extending from 5 to 25 of the scale, corresponding to the "structureless, unsymmetrical band" obtained by Ives and Coblentz (Bull. of the Bur. Standards, Wash., D. C., 1910, Vol. 6, pp. 321-336), in their excellent work on the luminous efficiency of the fire-fly. The light emitted by the *pennsylvanica* showed a shorter spectrum, extending from 7 to 24 of the scale, and that of the *consanguineus* even shorter, extending from 7 to 22 of the scale. These were single observations, which I have unfortunately been unable to more than partially confirm, but the fact that the spectrum of the light emitted by the two latter species appears to be shorter in the red end than that of the *pyralis*, would seem to account for its more decided green tinge. The red light which Dr. Knab and Mr. Barber (Proc. Ent. Soc. Wash, 1908, Vol. 9, pp. 41-43) mention as being noted in tropical species of *Phengodes*, is not regarded by Dr. Coblentz as being due to absorption in the chitin, as it would be but poor economy to generate such an efficient light, and then absorb a portion of it before its passage from the generating organ.

What the substance is that is burned to produce this light we do not know. A large number of chemicals and mixtures of chemicals have been found to give light under certain conditions, usually of oxidation. One of these (formaldehyde and pyrogallol, oxidized by strong hydrogen peroxid solution), investigated by Max Trautz (Zeitschrift f. physikal. Chemie, 1905, Vol. 53, pp. 1-111), produced a light whose spectrum appears to roughly approximate that of the fire-fly.

In this connection I have found that the spectrum of the light produced on moistening with commercial three-per-cent. hydrogen peroxid solution, the ground luminous tissue of the *pyralis*, which has been dried in hydrogen over sulphuric acid, extends only from 9 to 15 of the scale of the spectroscop; that is, it lies mainly in the yellow and yellow-orange portions of the spectrum.

Some as yet unfinished histologic studies indicate that the structure of the photogenic organs of *Photinus pyralis* and *Photuris pennsylvanica* are approximately the same, and much as described by Townsend (American Naturalist, 1904, Vol. 38, pp. 127-151), for *Photinus marginellus*.

The question naturally arises, "What is the purpose of the light-emission?" That this phenomenon has some relation to the sexual function is scarcely to be doubted. Just why this family should possess this power, while it is limited to occasional members of other families and of other orders of insects, that is, just what conditions of life and environment render it necessary as an adjunct to the sexual function, is not yet determined. Ehrenberg, in his extensive work, "Das Leuchten des Meeres" (Abhandl. d. k. Akad. d. Wissenschaften, Berlin, 1834-1836, pp. 411-575), agrees that, while the explanation that the luminosity is an adjunct of the sexual function is acceptable for the Lampyridæ and other bisexual forms, it will not hold for the hermaphroditic marine organisms that are luminous, while Watasé (Protoplasmic contractility and Phosphorescence, Biol. Lectures, Wood's Hole, 1898, pp. 177-192) seems to leave one with the impression that he regards phosphorescence as a potential property of all protoplasm. I have no further explanation to offer in this connection, but the following chance observation may be of interest:

I was looking over a fence down a sloping field, a little later in the evening than the period of greatest activity on the part of the *pyralis*. There was no sign of luminosity nearby, though some distance away several males of the *pyralis* were flying about. One of these flew towards the fence, and then dropped downward, giving his characteristic dipping flash. Immediately the less intense lights of several *pyralis* females appeared in the nearby weeds, where their presence had theretofore not

been suspected. Since observing this instance, several similar, but not so clearly defined cases, have been noticed. Barber's observations on *Phengodes laticollis* (Proc. Wash. Ent. Soc., Vol. 7, pp. 196-197), also point strongly to the relation between luminosity and sexual function in that species.*

Both sexes of *pyralis* appear to be non-luminous during copulation, but flash if disturbed.

The phenomenon would be easier to understand if only the apterous or more sluggish females were brightly luminous, while the males, as in *Phengodes laticollis*, were non-luminous, or but slightly so. But in our two species most common here the male is either considerably brighter than the female or approximately equal to his mate in brilliancy. The luminosity of larvæ is also a little hard to comprehend, except as a developmental form of a rudimentary organ. Dubois has claimed that even the unfertilized eggs are luminous.

That the light has also a protective function is also readily surmised. I have heard of at least one *bona fide* instance, where the sudden flash of a fire-fly saved him from being made a portion of the evening meal of a chicken. Between the light which they give and the sticky exudation and unpleasant odour of most species, it seems hardly likely that they would prove a tempting morsel to insectivorous creatures. Toads, it is said, have been known to eat them.

There seems to have been some discussion, in times past, as to whether the light-emission of the various luminous forms was voluntary, or at least under the control of the organism. One argument that was advanced against the view that the phenomenon was under the control of the organism was that the light of the luminous tropical elaters, cucuyo, etc., was constant, and not intermittent. Anyone who studies the natural light-emission of the Lampyridæ can scarcely help but conclude that, except when they are subjected to some powerful excitement, such as mechanical, electrical or chemical stimuli external to the organism, the light-emission is entirely voluntary, and under the control of the will. Apparently the insects of the group *Luciola* emit a continuous twinkling, which has been stated to be synchronous with the respiratory movements of the abdomen, or with the circulatory impulses of the hemolymph; such synchronism may exist, but it would hardly seem to be proof that the light-emission was not under the control of the insect's will. The cucuyo, indeed, has been observed to vary the intensity of its light apparently entirely at will.

*I regret that in this connection I have not yet been able to secure a recent paper by Meissner, "Wie leuchten die Lampyridæ?" in the *Entomologische Wochenblatt*, 1907, Vol. 24, p. 61.

LARVA OF *PTOCHORYCTIS TSUGENSIS* KEARFOTT.

BY W. T. M. FORBES, NEW BRUNSWICK, N. J.

Head and cervical shield heavily chitinized; anal plate less so. Tubercles broad. Granulations of fine sinuous lines of dots in the thinner portions, becoming polygonal patches of dots on the tubercles.

Head higher than wide, a little squarish at the top. Epicrania high, extending far above top of adfrontals and setæ i; i directly above ii and separated by only about $1\frac{1}{7}$ height of head (measured from lower edge of clypeus to vertex); ii distant from adfrontals; six ocelli, the posterior on a level with the lower anterior, but separated by a cleft extending up from the antennal membranous area. Lower ocellus at middle of posterior edge of the antennal area. Front only $1\frac{1}{5}$ height of head, about as high as wide, the setæ about a third way up and far apart; the punctures $\frac{1}{4}$ as far apart and much lower. Adfrontals broad, not extending far above top of front, with both margins evenly sinuous; i above top of front, and puncture much nearer to it than to ii. Clypeus large, with setæ far apart. Labrum slightly notched, ii higher than i, iii obliquely above iv; puncture between i and ii and higher. First free joint of maxillary palpus not as large as in *Cacoxia* (Ann. Ent. Soc. Am., III, pl. 20, fig. 137); sclerites of maxilla separate, the stripes more lightly chitinized, the subgalea sending a projection between the palpifer and base of palpus; cardo large. Submentum and mentum fused, the lines of separation indicated by two parallel longitudinal slits, between which there is a chitinized area. Setæ distant. Antennæ about as in *Simathis* (loc. cit., fig. 140), but the first two joints are equal in diameter.

Cervical shield as wide as the segment, extending down to the spiracle; it may fuse shortly with the large prespiracular plate in front of it. Meso- and metathorax, with ia + ib, iia + iib; iv + v and on a level with iii. True legs moderate. On the abdomen, i and ii are on a level, distant; iii is a large ring, in the centre of which there is a small ring bearing the seta and a couple of projections; iv + v, iv minute, above and in front of v; vi single; vii consisting of an oblique row of five setæ and a sixth just behind the upper two. Prolegs not strongly projecting, with a complete ellipse of 50 hooks, alternately of $2\frac{1}{3}$ -lengths. Anal prolegs with a bent bend of hooks, and also with extra setæ in the region corresponding to vii. On A1 and A2 vii is of 3 setæ; on A7 of two and on A8 and A9 of one only. On the ninth segment i and ii are obliquely placed, and ii are very far apart.

The outer ring of iii might be easily mistaken for a spiracle, and only occurs on the spiracle-bearing segments of the abdomen.

A NEW THECLA FROM TEXAS.

BY WILLIAM BARNES, M. D., AND J. MCDUNNOUGH, PH. D. DECATUR, ILL.

Callicista Laceyi, n. sp.

♀.—Palpi white, terminal joint shaded with black on its upper surface; antennæ black, ringed with white and tipped with orange, with a few fulvous hairs at base; front and collar white; thorax and abdomen black, with sparse grayish hairs. Upper side deep blackish-brown; primaries unmarked, with narrow white fringes shading into brown towards apex; secondaries with anal angle slightly tipped with orange, preceded by a small black patch and a few white scales; along the outer margin, between 1st anal vein and M_3 three black lunulate patches bordered towards the base of wing with white scaling: of these the third is the smallest and least prominent; a white subterminal line extends from anal angle to vein M_2 , followed by a terminal black line, which also tends to merge into the ground colour of the wing towards costa: fringes broader than on primaries, pure white, with the exception of the anal angle, where they are brown; tail single, 3.4 mm. long, bordered with white at base and tipped with same colour.

Beneath primaries pale mouse-gray, with somewhat darker terminal line and a double row of 6 terminal spots, of which the outer row is rather obscure and oval, the inner one lunate and slightly shaded with orange on lunules 4 and 5; interspace between the two rows scaled with white; well beyond the cell the wing is crossed by an irregular band composed of three distinct dashes, edged inwardly with orange, outwardly with white, and extending as far as vein Cu_2 ; of these the central dash is situated slightly nearer to the outer margin than the other two; below vein Cu_2 the band is indistinctly represented by two oblique dark gray dashes, shaded outwardly with white, and forming a broken V-shaped mark, with apex directed toward base of wing; an obscure white bar at end of cell; fringes concolorous with wing.

Secondaries mouse-gray, strongly scaled with white: dark terminal line, bordered inwardly with white and slightly enlarged at termination of veins; double row of distinct terminal lunules separated by white scaling, as on primaries, inner row becoming reduced to mere dashes towards anal angle; of the outer row, the spot between Cu_1 and Cu_2 is large: deep black and broadly margined with orange; the following spot is scaled with blue, showing traces of black only towards anal angle; anal patch black, separated from preceding spot by a narrow band of orange and

bordered internally with white ; beyond the cell an irregular linear band, crossing the entire wing, and bordered outwardly with white and inwardly with orange ; this band is somewhat outcurved opposite the cell, forming below the median vein a prominent W, the apices of which rest on veins Cu_2 and 1st anal respectively ; an obscure geminate bar at end of cell and traces of a discal band, chiefly confined to a dark dash, edged inwardly with white near costal margin, and a similar one in the cell ; dark basal spot, edged outwardly with white ; fringes whitish, slightly checkered with gray.

Expanse, 22 mm.

Habitat.—Del Rio, Texas (July), 1 ♀. Type, coll. Barnes.

This species approaches *columella* Fab. rather closely in its general markings ; can, however, be readily distinguished by the linear nature of the banding on the under side and the prominent W mark ; in *columella* the bands are decidedly macular in character, and the ground colour of the under side is further of a much deeper brown than in our species. We take pleasure in naming the insect after the collector, Mr. H. Lacey, who has added so considerably to our knowledge of Texan Lepidoptera.

SOME INSECTS FROM STEAMBOAT SPRINGS, COLO.—II.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

HYMENOPTERA APOIDEA.—(Continued.)

Halictus vaporellus, n. sp.

♀.—Length slightly over 6 mm., black, hoary with thin pale pubescence ; abdomen without band or patches ; hind spur pale, with four spines, the first three long ; posterior truncation of metathorax with a distinct edge only near base ; apical half of mandibles dark red ; flagellum slightly (variably) brownish beneath. A small species of the subgenus *Eryteus*, in all respects extremely close to *H. Foxii* Rob. (possibly a subspecies of it), but differing as follows : Stigma dusky reddish-brown ; sculpture of area of metathorax considerably finer ; face rather narrower. In Crawford's table (Jn. N. Y. Ent. Soc., Dec., 1907), it will not run to *Foxii* on account of the stigma, and when run to *quadrimaculatus* and allies fails to agree because of the absence of hair-patches on the abdomen. Under the compound microscope, the sculpture of the front and mesothorax is seen to agree with *Foxii*. The second abdominal segment is punctured as well as transversely lineolate.

Hab.—Steamboat Springs, Colorado, May 27, 2 ♀'s.

November, 1910

Halictus Lerouxii Lep.—1 ♀.

Halictus Cooleyi Crawf.—1 ♀.

Halictus arapahonum Ckll.—9 ♀'s.

Sphecodes (Sphecodium) nitidissimus, n. sp.

♀.—Length a little over 5 mm., very shiny; black, the abdomen bright chestnut-red, fourth segment (except extreme base), fifth and apex black; face with white hair; eyes converging below; mandibles bidentate, red, except at base; labrum entire; clypeus sparsely punctured; flagellum thick, faintly brownish beneath; mesothorax rather sparsely punctured, parapsidal grooves strong; area of metathorax regularly crescentic, very strongly defined, with irregular longitudinal wrinkles; legs black with silvery hair, small joints of tarsi becoming brownish; tegulae brown, pallid toward margins; wings gray, nervures and stigma piceous; abdomen very smooth, the second segment hardly at all punctured. Close to *S. Cressonii* Rob., but separated by the dusky wings and the regularly crescentic (instead of boat-shaped) area of metathorax. From *S. cunctatus* Ckll. it is readily known by the almost impunctate abdomen.

Hab.—Steamboat Springs, Colorado, May 27, 1 ♀.

Nomada (Nomada s. str.) fontis, n. sp.

♀.—Length about 7 mm., rather slender, bright ferruginous red, marked with black; a little yellow at lower corners of face; second to fourth abdominal segments with a small yellow spot on each side, fifth without yellow, although a pair of very faint yellowish dorsal spots can be seen on close inspection; head broad; eyes dark (not at all greenish); the scanty hair of head and thorax white; front and vertex each with a large black patch; cheeks black behind; flagellum thick, red above and below; third antennal joint yellowish in front, much shorter than fourth on outer, and somewhat shorter on inner side; mesothorax rough, with three black stripes; scutellum moderately prominent, scarcely bigibbous; metathorax with a broad median black stripe; pleura red, but above is a round red area surrounded by black; legs red, more or less suffused with blackish; tegulae red, punctured; wings dusky, with a pallid area beyond the cells; stigma ferruginous; nervures piceous: b. n. going a very short distance basad of t. m.; second s. m. receiving first r. n. about the beginning of its last third; third s. m. large, but narrowed nearly to a point above; abdomen minutely punctulate, hind margins of the segments broadly dusky, but not black; base of first segment with a blackish spot on each side; venter clear red. Close to *N. nigrocincta* Smith, and

perhaps a subspecies of it, but the abdominal bands are much paler, and the markings differ in many details.

Hab.—Steamboat Springs, Colorado, May 27, 1 ♀.

Nomada (Gnathias) bella Cresson.—1 ♀.

Andrena prunorum Gillettei Ckll.—4 ♂'s.

Andrena (Micrandrena) amplificata, n. sp.

♂.—(Type.) Length, 9 mm., or slightly over; black, with the front and abdomen very dark bluish; pubescence white, long on head and thorax, black at sides of face and on upper part of cheeks; clypeus very pale yellow, with the usual black spots, the lower edge black; head broader than long; tongue very short; cheeks ordinary; front longitudinally striate; antennæ black, third joint about as long as the next two together; mesothorax microscopically tessellate, with sparse but distinct punctures, shining in the middle; area of metathorax not defined, granular, slightly plicate basally; legs black, with white hair, slightly yellowish on inner side of tarsi; spurs dark; tegulæ dark; wings smoky; stigma large, ferruginous; nervures fuscous; b. n. falling short of t. m.; first t. c. not ending very close to stigma; apex of marginal cell on costa; abdomen with a sericeous surface, and scattered piliferous punctures only; no distinct hair-bands, but indications of a fringe on segments 2 and 3 laterally; apical ventral plate emarginate.

♀.—Length, 9 to 11 mm.; body colours as in male; hair of head and thorax above slightly ochreous; hair of face, scape, cheeks and pleura black (in large specimen pale on upper part of pleura); clypeus shining, with well-separated punctures and a median smooth line; process of labrum narrowly truncate; antennæ dark, third joint longer than next two combined; front striate; facial foveæ dark seal-brown, about half as wide as space between eye and antenna, separated from eye by only a shining line, scarcely going below level of antennæ; scutellum very smooth and shining, with scattered punctures; wings reddish; middle and hind basitarsi large and broad, with black hair; femora and tibiæ also with black or sooty hair; apical hair of abdomen soot-colour; second segment depressed nearly one-half (less in large specimen); pygidial plate triangular, narrow at apex. The large specimen differs in a few details, and might be thought distinct, but I am confident that it belongs with the others.

Hab.—Steamboat Springs, Colorado, May 27. I believe it gathers pollen exclusively from the Cruciferae, principally from *Thelypodium*. It

is a relatively gigantic representative of the group of *A. zizie*, *personata* and *pacifica*. Among the Colorado species it has a strong superficial resemblance to *A. topazana* Ckll., but is easily separated by the black hair of face and pleura, and the absence of long pale hair on the basal segments of the abdomen, the latter, in the female, being as dark and bare as that of *A. carlini*. There is another rather similar species which Viereck has named in manuscript. Three females and two males were taken. I have not seen the European *A. cyanescens* Nyl., but from the description it seems to be a related species.

Andrena Wheeleri Grænicher.—1 ♀. I have compared this minutely with a specimen from Dr. Grænicher, and cannot see any difference. My specimen has collected a quantity of bright orange pollen, which can hardly come from the Umbelliferae, on which, in Wisconsin, *A. Wheeleri* is oligotropic. A female *A. Wheeleri*, from Waldoboro, Maine, from Mr. Lovell, was collected at flowers of *Sedum acre*.

Andrena phocata, n. sp.

♀.—Length about 8 mm., black, with a dull white pubescence, long on head and thorax; head and cheeks normal; process of labrum broadly truncate; clypeus convex, very shiny, with well-separated punctures and a median mouth-band; antennae dark, third joint about as long as the next two combined; vertex and front dull and granular; distance from lateral ocelli to occipital margin hardly equal to diameter of ocellus; facial foveae bicoloured, seal-brown above, white below, occupying rather more than half space between eye and antenna, little separated from eye, going a short distance below level of antennae; mesothorax rather shiny, microscopically tessellate, sparsely, minutely punctured; scutellum shining, sparsely punctured; area of metathorax dull and roughened, not defined; legs black, with pale hair, that on hind tibiae and tarsi tinged with yellowish; spurs pale; tegulae rufopiceous; wings strongly reddish, stigma and nervures ferruginous; abdomen shining sericeous, impunctate; segments 2 to 4 with thin bands of long white hair, that on 2 broadly, and on 3 narrowly interrupted; apical fimbria shining pale yellowish; second segment depressed hardly one-third, but deeply.

Hab.—Steamboat Springs, Colorado, May 27, 1 ♀. Exceedingly like *A. fragiliformis* Ckll., but separated by the smoother area of metathorax, and the shining, more sparsely punctured clypeus and mesothorax. The bicoloured facial fovea is also distinctive. It is also allied to *A. runcinata* Ckll., but much smaller, with differently-coloured caudal fimbria, etc.

HYMENOPTERA FORMICOIDEA

The few ants I collected were kindly determined by Dr. W. M. Wheeler, as follows :

Camponotus maculatus, subsp. *vicinus*, var. *nitidiventris* Emery.

Formica rufa, subsp. *obscuripes* Forel.

F. subpolita Mayr.

F. fusca, var. *argentata* Wheeler.

F. fusca, var. *neoclara* Emery.

Lasius niger, var. *neoniger* Emery.

Myrmica brevinodis, var. near *sulcinodoides* Emery.

HEMIPTERA.

The following were kindly determined by Dr. Van Duzee :

Lygus pratensis L., var.

Thyreocoris extensa Uhler.

Irbisia brachycerus Uhler.

Thamnotettix Belli Uhler.

A NEW ALEYRODES ON AMBROSIA.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

In my garden at Boulder, Colorado, *Ambrosia artemisiæfolia* L. is one of the most troublesome weeds. I thought it had nothing to recommend it, but in this I was wrong, for it supports an interesting new species of *Aleyrodes*, the pupæ of which may be found on the under surfaces of the leaves.

Aleyrodes ambrosiæ, n. sp.

Adult.—Body about 930 μ long ; anterior wing, 1070 ; eyes divided ; second antennal joint large ; body very pale yellow, marked with gray ; a gray transverse band on each side of the head posteriorly ; a pair of dusky spots on mesothorax ; anterior part of metathorax very dark ; abdominal segments with ill-defined dusky bands. Anterior wings white, with six conspicuous gray spots, forming two transverse rows ; the first row, a little before middle of wing, has two spots below the main vein and one above ; the middle of the three is more basad than the others, so that they form the corners of a low triangle ; the lower two spots are subquadrate, the upper is elongate and oblique, rather inclined to be divided ; the second row of spots, in the subapical field, consists of two large subquadrate ones, and a longitudinal streak (more basad) between them ; there is also a slight dot above the basal end of the streak, and a slight apical spot. Hind wing white, with two faint subbasal spots, the lower one more basad.

Pupa about 680 μ long, white, slightly suffused with ochraceous dorsally, especially the operculum, or with a distinct suffused orange patch; sides vertical, striate, margin minutely crenulate; a pair of short caudal filaments; fringe consisting of a series of curled, glassy transparent rods, about 80–100 μ long, very easily deciduous, and always inconspicuous, so that an old pupa seems to be without a fringe; vasiform orifice normal, emarginate at apex, about 52 μ long; operculum very broad and low, about half length of vasiform orifice; lingua broad and rounded, with one notch on each side of the portion projecting beyond the operculum, and the usual apical bristles; in the subdorsal region there is on each side a series (one to each segment) of large round pores, practically as in *A. iridescens*, but beyond these, near the margin, are numerous irregularly-placed smaller circular hyaline pores, resembling the subdorsal pores of *A. glacialis*. The structure of the vasiform orifice and appendages is nearly as in *A. spireoides*, except that in the latter the apex of the orifice is entire, and the bristles of the lingua project. In the last-mentioned characters the new species resembles *A. Waldeni*. The spotted wings recall those of *A. Fitchi*.

Hab.—Boulder, Colorado, Aug. 13, 1910.

NOTE ON *PLATEROS COCCINICOLLIS* FALL.

This species is described by Fall in Trans. Amer. Ent. Soc., June, 1910, p. 139. The type is the *Plateros*, sp. nov., of the New Mexico list, Trans. Amer. Ent. Soc., June, 1907, p. 181. Mr. Fall also cites "Boulder, Colorado," but the specimen referred to was collected by myself in Boulder Cañon, Sept., 1907, at 7,340 ft. altitude, *Tenebrioides occidentalis* Fall, t. c., p. 128, is the *T.* sp. dub. of the New Mexico list.

T. D. A. COCKERELL.

LEPIDOPTEROUS GALLS ON SPECIES OF *SOLIDAGO*.

BY A. COSENS, TORONTO, ONT.

A great deal of the work done in the science of cecidology has been accomplished by observers who have been more interested in the entomological than in the botanical aspect of the subject. As a consequence of this, the host-plants affected by the various galls, in many cases, have not been specifically determined. The fact, however, that each gall is restricted to certain species of host-plants makes this side of the science an interesting and important one.

November, 1910

As the botanists are becoming more interested in the study of galls, future lists will, in all probability, contain a closer classification of the host-plants of the various galls.

In the vicinity of the City of Toronto the galls produced on *Solidago* plants by Lepidoptera are of frequent occurrence, and the various forms are closely restricted to certain species of host-plants.

In the locality mentioned, the gall produced by the moth *Eucosma Scudderiana* Clemens, is found abundantly on *Solidago Canadensis* L., and very seldom on *S. serotina*, var. *gigantea* Gray.

The moth *Gnorimoschema gallesolidaginis* Riley, produces its galls frequently on both of these species of *Solidago*; the galls on the latter host are, however, slightly less numerous.

The moth *G. asterella* Kell., produces galls which are locally abundant on *S. latifolia* L., but are found very rarely on *S. caesia*, var. *axillaris* Gray.

In the CANADIAN ENTOMOLOGIST, Vol. XLI, No. 5, p. 157, the late Dr. Brodie records the notes he has made on the gall produced on *S. caesia*. In these occurs the following statement: "There is a suspicion that the *S. caesia* gall is produced by *G. asterella* Kell." Profiting by these observations and taking advantage of the fact that the galls were comparatively numerous this season on *S. caesia*, several of the entire host-plants were removed and placed in vessels of water under bell-jars. A number of the galls produced on *S. latifolia* were taken at the same time. From Aug. 12th to 19th producers were emerging from the galls on both species of plants. Specimens of the moths, bred from each species of plant, were sent to Mr. August Busck, of the United States National Museum, Washington, D. C., and he has kindly given an authoritative classification of the producers. He states, "the gall-moths bred from both *Solidago* species are without any dispute *G. asterella* Kell."

The gall produced on *S. caesia* is quite unlike the *S. latifolia* gall in appearance, but as both galls are merely spindle-shaped enlargements of the stems of the host-plants, this difference in outward form can easily be explained. The glaucous, terete and slender stem of *S. caesia* produces a gall with glaucous epidermis, circular in cross-section and gradually tapering towards each end. On the other hand, the smooth, angled and comparatively thick stem of *S. latifolia* gives rise to a gall with smooth epidermis, somewhat triangular in cross-section. This gall has also a greater diameter and tapers more abruptly than the *S. caesia* gall.

TARGIONIA CELTIS, N. SP.

BY GLENN W. HERRICK, ITHACA, N. Y.

Scale of female.—It is nearly circular, quite convex, light gray in colour, and with the exuviae central to subcentral. The scale is thick and tough, and the ventral scale is conspicuous and entire, thus enveloping the insect in a complete shell. It is smaller and lighter in colour than the scale of *T. vitis*, and not so thick in texture. Diam., 1.17–1.47 mm.

Scale of male.—Like that of the female in colour, but smaller, less convex, thinner, and somewhat elongated.

Female.—The body is nearly circular in outline, with a broad short pygidium. (Fig. 20.) Only one pair of lobes is present, the median, but these are large and prominent. They are very close together, nearly

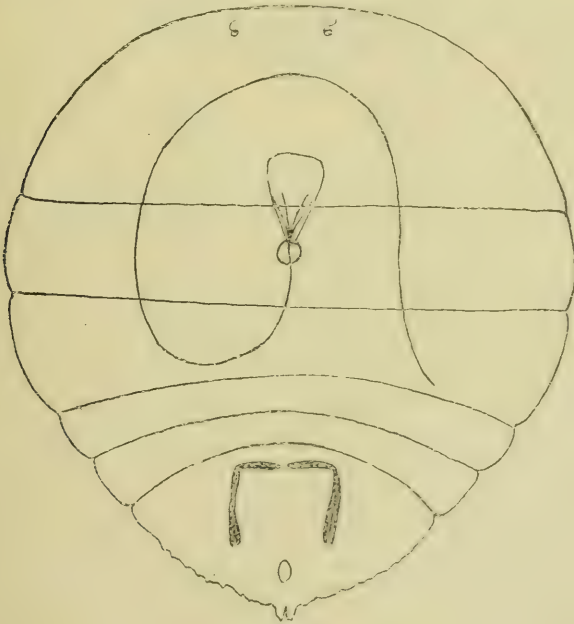


FIG. 20.

parallel on their inner margins, but obliquely rounded on their outer margins, which causes them to apparently converge. They are plainly notched on the outer margins, and sometimes on the inner margins near

the ends. The bases of the lobes extend cephalad into the pygidium by long slender chitinized processes similar to those of *T. vitis*. (Fig. 21.) There are two plates just laterad of the median lobes, two broad plates

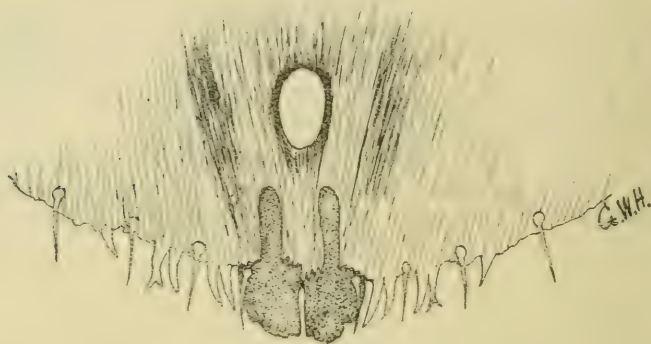


FIG. 21.

between the second and third setae, one of which is bifurcate at the distal extremity. There is a seta on the lateral bases of the median lobes, one just laterad of the first two plates, one just laterad of the second two plates, a fourth one some distance laterad of the third, and a fifth half way to the penultimate segment. (Fig. 21.) The anal opening is low and elongate oval. There are no circumgenital pores, but there are two longitudinal chitinous bands forked at the distal extremities where the anterior and posterior circumgenital pores are usually situated, and a broken transverse band where the median group is situated. (Fig. 20.)

This scale was found on the hackberry (*Celtis occidentalis*) at College Station, Texas. I have had opportunity to compare it with *Targionia vitis* Sign., specimens of which are in the Cornell Univ. collection, and they are quite distinct.

Nearly all the specimens were parasitized, but the parasites have not been bred as yet.

NOTES ON THE GENUS *THECLA*.

T. lutea Edwards.—I have taken two specimens of this rare species in the Huachuca Mountains of Cochise County, Arizona, in July of the present season, one being netted in Montezuma Canyon, through which

November, 1910

the Mexican line runs, and I believe that this will be the southern record of this species in our fauna for all time. *Lieta* has been recorded from Mt. Graham, in Graham County, and has also been found in the Chiricahua Mountains. It doubtless occurs in all the ranges of Southern Arizona. Though it is well distributed, ranging from Quebec south to West Virginia, and west to Montana, from whence it comes south to Sonora, it seems to be everywhere local and scarce. Arizona *Theclae* have been very much not in evidence this year. The first broods of *blenina* Hewitson, *lieta* Edwards and *spinetorum* Boisduval have been unduly scanty. *Apama* Edwards and *melinus* Hubner, however, were quite common. Of *ines* Edwards, usually an abundant species, I have only taken four or five examples. But two specimens of *halesus* have been seen, both in the Santa Rita Mountains. Dr. Holland (Butt. Book, p. 239) states that the larva of *halesus* is said to feed on various oaks. The food-plant, however, is mistletoe, upon which I have found eggs. *T. crysalus* Edwards has not appeared as yet (July). I can see no need of retaining *citima* Hy. Edwards in our catalogues as a variety of *crysalus*, since it is only an individual variant. What Mr. W. G. Wright, in his Butterflies of the West Coast, Pl. XXVII, figs. 322, b and c, figures as *T. spinetorum* is certainly not that species, but one of the *Incisalius*, a group that badly needs thorough revising. *T. chalcis* Behr. seems to be a pure synonym of *sapium* Boisduval.—[KARL R. COOLIDGE, Pasadena, Cal.]

CORRECTIONS TO MY PAPER ON THE TYPE-SPECIES OF THE NORTH AMERICAN GENERA OF DIPTERA.

BY D. W. COQUILLETT, WASHINGTON, D. C.

The paper referred to in the above heading was submitted for publication on May 11, 1909. During the long interval that elapsed before its publication on August 4, 1910, several articles bearing more or less on this subject appeared in print, necessitating several changes. Some of these, of minor importance, were made in the proof-sheets, but others were too extended to permit of being incorporated in this manner. These and a few others to which my attention has been called, are brought together in the following notes. I desire to express my thanks to Messrs. C. W. Johnson and O. A. Johannsen for calling my attention to several of these errors and omissions.

Page 506, *Anaclinia* should be in italics, and after "Meigen" add, "Equals *Neuratelia* Rondani, 1856."

November, 1910

Page 509, under "*Archytas*," change "*Musca*" to "*Tachina*."

Page 513, under "*Besseria*," after "1870" add, "*Oedemasoma* Townsend, 1908."

Page 518, before "*Cassidemyia*" insert the following :

"*Cartosyrphus* Bigot, Ann. Soc. Ent. France for 1883, p. 230, 1883, 11 species (as 12). Type, *Syrphus paganus* Meigen, the fifth species, by present designation."

Page 521, for the paragraph on *Cheilosia*, substitute the following :

"*Cheilosia* Panzer, Fauna Ins. Germ., Heft cviii, p. 14, 1809, 1 species. Type, *Musca laternaria* Muller (as *Syrphus rosarum* Fabricius). Syn., *Epistrophe* Walker, 1852; *Ischyrosyrphus* Bigot, 1882; *Lagenosyrphus* Mik, 1897."

Page 522, under *Chloromyia*, for "present designation" read "designation of Verrall, Brit. Flies, Vol. 5, 1909, p. 188."

Page 523, under *Chrysopilus*, change "*Musca*" to "*Rhagio*" and "Linnæus" to "Fabricius."

Page 532, under *Dialineura*, change "*Thereva* Latreille, 1796," to "*Psilocephala* Zetterstedt, 1838." (This error was due to following the Katalog Palaark. Dipt. and the published descriptions of the type-species. Verrall, in his British Flies, Vol. 5, 1909, p. 552, states that in this species the face is bare, and his statement is confirmed by an examination of a specimen in the National Museum.)

Page 534, *Dipalta* should be in italics, and at the end of the second line add, "Equals *Villa* Lioy, 1864."

Under *Dipsa*, second line, *bifurcata* is not now considered as being a synonym of *lutea*; change "*Lonchoptera*" to "*Musidora*," and "1803" to "1800."

Under *Docosia*, change "*Docosia valida* Winnertz," to "*Mycetophila sciarina* Meigen," and "second" to "first."

Page 539, *Epistrophe* should be in italics, and after "species" add, "Equals *Cheilosia* Panzer, 1809."

Page 544, *Exaireta*. (I do not agree with Verrall that this genus is a synonym of *Chorisops* Rondani, 1856. In the type species of the latter the palpi are minute and contained in the oral cavity, whereas in *spiniger* they are enormously developed, projecting half their length beyond the oral margin.)

Exechia should have been in black-face type.

Page 549, *Hartigia* should have been in italics, being preoccupied by *Hartigia* Schiodte, 1838. The valid name of the present genus is *Helicobia*.

Page 550, *Helicobia* should be in black-face type, and *Hartigia* in italics; the other two synonyms will be found under the latter genus.

Page 556, before *Isogaster* insert the following :

"*Ischyrosyrphus* Bigot, Bul. Soc. Ent. France for 1882, p. 68, 1882, 3 species. Type, *Musca glaucius* Linnaeus, the first species, by original designation. Equals *Cheilosia* Panzer, 1809." (Our species intergrade completely with typical *Cheilosia*, that is, *Syrphus* of Verrall, etc.)

Page 657; before *Lambertia* insert the following :

"*Lagenosyrphus* Mik, Wien. Ent. Zeit., Vol. 16, p. 64, 1897, 4 species. Type, *Syrphus leiophthalmus* Schiner and Egger, the first species, by original designation. Equals *Cheilosia* Panzer, 1809."

Page 562, *Lonchoptera* should have been in italics : at the end of the third line add, "Equals *Musidora* Meigen, 1800."

Page 571, under *Mulsantia*, after "designation" insert, "Not *Mulsantia* Reichenbach, 1853," and change "*Hartigia* Desvoidy, 1863," to "*Helicobia* Coquillett, 1895."

Before *Mutilloptera* insert the following :

"*Musidora* Meigen, Nouv. Classif., p. 30, 1800. No species. *Lonchoptera* Meigen, 1803, was a change of name. Type, *Lonchoptera lutea* Panzer. Syn., *Lonchoptera* Meigen, 1803."

Page 575, before *Neurigona* insert the following :

"*Neuratelia* Rondani, Dipt. Ital. Prod., Vol. 1, p. 195, 1856, 1 species. Type, *Mycetophila memorialis* Meigen. Syn., *Anaclinia* Winnertz, 1863."

Page 578, *Oedemasoma* should have been in italics; at the end of the second line add, "Equals *Besseria* Desvoidy, 1830."

Page 581, change "*Americana* Needham," to "*Sayi* Johnson (as *Tipula annulata* Say)."

Page 585, before *Parasymmetus* insert the following :

"*Parasteinia* Cockerell, CAN. ENT., Vol. 37, p. 361, 1905. Change of name for *Tetracheta* Stein, preoccupied. Type, *Tetracheta unica* Stein. Equals *Tetramerinx* Berg, 1898."

Page 588, before *Philia* insert the following :

Philhelius Stephens, Entom. (Newman's), Vol. 1, p. 2, 1841,* 2 species. Type, *Musca citrofasciata* DeGeer, by present designation. Syn., *Xanthogramma* Schiner, 1860."

Page 595, before *Prodiplosis* insert the following :

"*Prodiamesa* Kieffer, Gen. Ins., Dipt., Chiron., p. 37, 1906, 7 species. Type, *Diamesa præcox* Kieffer, the last species, by original designation."

Page 597, under *Psilocephala*, after designation add, "Syn., *Dialineura* Rondani, 1856."

Under *Psilotanypus*, change "7" to "3"; "*bellus* Loew," to "*occidentalis* Coquillett," and "first" to "second" (the other four species were doubtfully referred to this genus, according to the two footnotes—moreover, *bellus* belongs to the genus *Procladius*).

Page 600, *Rhynchocephalus*. (Verrall, in his British Flies, Vol. 5, 1909, p. 445, separates this genus from *Nemestrina* by a character not used by previous writers—the presence of a vein between the third and fifth posterior cells in the latter genus and its absence in the former ; but the one employed by Rondani, Schiner and later continental writers—the multiplicity of accessory cells in the wings of *Nemestrina*, and their absence in those of the other genus—is a far better character.)

Page 610, under *Symphoromyia*, change "1 species" to "3 species," and after "Meigen" add, "the first species, by original designation."

Page 611, under *Syrphus*, change "*Epistrophe* Walker," to "*Cheilosia* Panzer."

Page 613, under *Tetramerinx*, after "preoccupied" add, "*Parasteinia* Cockerell, 1905."

Page 614, under *Thereva*, strike out "Syn., *Dialineura* Rondani, 1856."

Page 616, before *Trichomyia* insert the following :

"*Trichocladius* Kieffer, Ann. Soc. Sci. Bruxelles, Vol. 30, p. 356, 1906, 1 species. Type, *Orthocladius fissicornis* Kieffer."

Page 619, under *Willia*, after 1869 insert, "*Dipalta* Osten Sacken, 1877."

Page 620, *Xanthogramma* should be in italics; after 91 add, "Equals *Philhelius* Stephens, 1841."

BOOK NOTICES.

THE COLEOPTERA OR BEETLES OF INDIANA: By W. S. Blatchley, Department of Geology and Natural Resources. Bulletin No. 1, State Printers, Indianapolis.

Since the publication of Dr. Holland's Butterfly and Moth Books and Dr. Howard's Insect Book, enquiries are frequently received respecting a beetle book. Hitherto there has been no work of the kind on North American Coleoptera, and it is, therefore, a great gratification to announce the publication of this monumental work by Prof. Blatchley. It is an octavo volume of 1,386 pages, and is illustrated with nearly 600 excellent drawings and photogravures.

An introductory chapter is given on the external anatomy of the Coleoptera, with explanatory diagrams. The various families of the order are then taken up, the classification being based upon that of LeConte and Horn, with the exception of the Rhyncophora, which are omitted "for lack of time and space," but which, we trust, the author will be enabled to take up in a subsequent volume. The plan of the work is to give a general introductory description of the family, followed by a key to the genera; each genus is then described in turn, and keys furnished to the species, figures being usually given to aid in recognition of the appearance or characteristics of the family or genus, as the case may be; to this succeeds a concise description of the species, with bibliographical references, localities, habits, dates of capture, etc. Nothing could well be more complete where such an immense field has to be covered. About 80 new species have been described during the course of the work. We have tested the work somewhat carefully, by taking specimens of various families and tracing out the species by means of the keys and descriptions. It has been a pleasure to do so, and to find that all necessary details are given and that the utmost accuracy prevails. A very full glossary of terms and an index to genera are given at the end of the volume.

The author has confined his work to the Coleoptera to be found in the State of Indiana, but this limitation does not impair its value for entomologists in Ontario and the States contiguous. A very large proportion of the species described are to be found within our boundaries, and the volume may therefore be safely recommended as a handbook of the order to all students in this region of North America.

The volume has been issued by the Indiana Department of Geology as a bulletin, owing to the refusal of the State Printing Board to publish

it in the annual reports on the Natural History of the State, owing, no doubt, to its great size. This unfortunate decision has caused the edition to be limited to a thousand copies distributed by the Department, and 300 placed on sale by the Nature Publishing Co., 1,530 Park Ave., Indianapolis, Ind., from whom they may be procured at \$4.50 each, postage or express charges extra. Early application is recommended, as this small edition will do doubt be soon exhausted.

C. J. S. B.

THE HOUSE-FLY : A Study of Its Structure, Development, Bionomics and Economy. By C. Gordon Hewitt, D.Sc., Dominion Entomologist, Ottawa, and late Lecturer in Economic Zoology in the University of Manchester. Manchester, 1910.

The three parts of Dr. Hewitt's valuable Monograph on the House-Fly, which were published in the Quarterly Journal of Microscopical Science in 1907, 1908 and 1909, respectively, have recently appeared in book form as a publication of the Manchester University Press. The book also includes several appendices, in which additional facts and information of much practical importance are given for the first time.

The first part gives a very full account of the anatomy of the fly, the second of the breeding habits, development and anatomy of the larva, the third part of the bionomics, allies and parasites of the house-fly and its relations to human disease. Each of these parts is concluded with a useful summary of the facts discussed, and a full bibliography. In the appendices further observations are given on the dissemination of the organisms of human disease by house-flies, breeding habits, preventive measures, etc.

The book is illustrated by nine beautifully executed lithographic plates, the first one giving coloured figures of the house-fly and several allied forms commonly met with in houses; the others illustrating anatomical details of the adult fly and of its larva and pupæ, except the last plate, on which the characters of the various flies that are associated with the house-fly and of the enemies and parasites of the latter are depicted.

A brief perusal of a few pages of the letter-press and a mere glance at the illustrations are sufficient to leave no doubt in the mind of the reader as to the high character of this work and the thoroughness and patience with which the author has prosecuted his investigations.

Now that the work is in book form, and is accessible to all, it is to be hoped that its valuable lessons will be the means of stimulating effort in the eradication of the many evils for which the house-fly is responsible.

Mailed November 11th, 1910.

The Canadian Entomologist.

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LONDON, DECEMBER, 1910.

No. 12

NOTES ON CERTAIN SPECIES OF GRAPTOLITHA.

BY HENRY H. LYMAN, M. A., MONTREAL.

In 1868 Grote & Robinson, in Trans. Amer. Ent. Soc., I, used the generic title *Xylina* Ochs. in describing *Bethunei* and *capax*, Guenée and Walker having previously used the same term, but in 1875 Grote in his check list adopted instead the name *Lithophane* Hubn., which he continued to use, but Dr. J. B. Smith in his check list of 1891 reverted to the name *Xylina*, and in his catalogue of 1893 wrote: "I use this name in preference to *Lithophane* because both are catalogue names and *Xylina* has priority." Dr. Dyar used the same name in his catalogue, but Sir George Hampson has adopted the name *Graptolitha* from Hubner's Verzeichniss, which he dates 1827, the year following Hubner's death.

In my paper on Entomological Errors, published in the last Annual Report of the Society, I said the origin of these errors could in most cases only be surmised, but I have no doubt that a large proportion of them arose from entomologists naming specimens from memory, as such a practice in closely allied forms is certain to cause errors.

In 1874 Grote described *Lithophane petulca* in the 6th Annual Report of the Peabody Academy of Sciences of Salem, Mass., and also gave a description of *signosa* Walk., but in his paper on *Lithophane* in the Bulletin of the United States Geological and Geographical Survey, Vol. V, No. 2, 1879, he wrote: "In my own visit to the British Museum in 1867, I had no North American *Xylinas* to compare." and he was therefore compelled to trust entirely to his memory. In Smith's catalogue of *Noctuide* of 1893, that author wrote:

"*X. signosa* Wlk.

petulca Grt.

"The types are both in the British Museum, and refer to the same species. Mr. Grote has misidentified Walker's species, the *signosa* Grote remaining unnamed."

"*X. innominata* non nov.

signosa ‡ Grote.

"The new name is intended to apply to that species identified and labelled as *signosa* by Mr. Grote, and has no type specimen."

Dyar admitted the name *innominata* to his catalogue of 1902, but retained both the other names, but I have recently ascertained that what he had under the name *signosa* Walk., was not that species.

Hampson described and illustrated three species under these names in his Volume VI, the illustrations being Nos. 7, 13, 14 on plate CII, but the illustrations in that work are not always satisfactory, and in some cases are quite misleading, and for closely-allied species where the markings are not very distinct, I think that the three-colour photographic process gives better results.

My examination of these types at the British Museum in July last would seem to confirm the fact that Grote did misidentify the species afterwards named *innominata* by Smith, as what Hampson has adopted as the type of Smith's species is a specimen from the Grote collection bearing a written label on blue paper, with the name "*Signosa* Walk.," but it also established the fact that Smith was in error in saying that *petulca* Grote was the same as *signosa* Walk.

Grote's error was doubtless due to his not having any specimens for comparison, as stated above, but Smith had the two types before him. Whether he failed to notice the differences between them or considered them merely varietal, I do not know.

Signosa Walk., is a more evenly brown species, without the lighter shades of *petulca*, but it is much nearer to *petulca* than to *innominata*.

There are three specimens of *signosa*. The type is labelled :

U. S. America.

E. Doubleday.

46-110.

The second : U. S. America.

Grote collection.

82-54.

The third : Grote collection.

82-54.

Schenectady, N. Y.,

Sept. 29, 1875.

Lintner collection.

Hemina Grt., is a species which has been practically lost on this continent, various other species having been misidentified with it. I have

had for some years in my collection three gray specimens received from Mr. Heath, of Cartwright, Man., under this name, which were subsequently shown to Dr. Smith and confirmed by him as correctly named. Mr. Wolley Dod pronounced them *disposita*, which I was inclined to question, as all my other specimens of that species were decidedly browner, but Sir George Hampson concurred in Mr. Dod's determination.

Mr. Dod had, however, been mistaken about *hemina* until I showed him a specimen received from Mr. Horace Dawson, which beautifully fitted Grote's description. The correctness of this determination I was able to absolutely verify by comparison with the type, which, however, is a less fresh specimen, and somewhat lighter in colour. Hampson's illustration is too light and too brown, the species is grayer.

As the original description, published in United States Geological and Geographical Survey, is inaccessible to many entomologists, I transcribe it as follows :

"*Lithophane hemina*, n. s.

♂.—Allied to *disposita*, *petulca*, *signosa*, etc. Darker than *disposita*, longer-winged, and allied to that species in having a black basal dash, but more obscurely colored—dirty wood-brown—resembling *Hadena vulgaris* in this respect, but less warmly tinted. A black stain on submedian fold, where the median lines approximate, as in *signosa*. Terminally, the wing is twice stained with blackish. Spots and lines less distinctly limited than in *disposita*, and more as in *petulca*; orbicular irregular, oblique; reniform wide above. Hind wings fuscous, with fine black terminal line and paler fringes. Beneath the wings are paler, with distinct black discal spots, subirrorate; the under surface is much like *disposita*; there is a faint irregular line on secondaries, and the discal field of primaries is shaded with fuscous. Thorax a little darker than fore wings; abdomen dusky, with reduced tufts on the dorsum. Expanse, 40 mil."

"I have seen specimens in Mr. Hill's collection, collected in Lewis County, New York, in September. I am indebted to Mr. Hill's kindness for the type. The species seems to me to stand between *disposita* and *petulca*. There is a curious general resemblance in ornamentation and color between this species and the wider-winged *Hadena vulgaris*, while they are structurally easily distinguished."

Folsom's "Entomology" has just been published in the Japanese language from a translation made by Miyake and Uchida.

A SECOND PAPER ON THE GENERA IN THE SUBFAMILY CALLIPTERINÆ.

(CONTAINING THE TRIBES PTEROCOMMINI, CHAITOPHORINI AND VACUINI.)

BY H. F. WILSON, CORVALLIS, OR.

The first paper on the genera of this subfamily was published in the September issue of the CANADIAN ENTOMOLOGIST, and contained only the genera in the tribe *Callipterini*. The following generic descriptions are given in detail from the type species of each genus. Necessarily some of the characters thus given are specific.

Tribe PTEROCOMMINI.

This tribe contains those species which in general resemble the *Lachnus* group, and yet have more in common with the *Chaitophorini*. Antennæ variable in length, six segmented and not on antennal tubercles. Wing venation as in *Aphidini*, nectaries variable but larger and distinct from those of the *Chaitophorus* group. Cauda short, thick and broadly rounded as in *Lachnus*. Antennæ, body and legs with numerous fine short hairs, and the known species of this group have a row of spiracles or dentate-like processes along the sides of the abdomen. Some species have both.

Key to Genera.

Nectaries swollen or vasiform *Melanoxantherium*.
Nectaries cylindrical *Pterocomma*.

Melanoxantherium Schouteden.¹

Syn. *Melanoxanthus* Buckton (preoccupied).

A. Salicis Linn.

Antennæ six-segmented and longer than the body, spur of sixth segment longer than segment; third segment the longest. Wing venation regular, nectaries variable in length and size, but always vasiform or clavate. Cauda short and broadly rounded, anal plate broadly rounded. Body, legs and antennæ with fine tubercles, each one bearing a fine hair.

Pterocomma Buckton.²

Syn. *Cladobius* Koch.

Aphioides Passerini.

Aristaphis Kirkaldy.

type *pilosa* Buckton.

Antennæ six segmented, and about one-half the length of the body, spur of sixth segment longer than the segment; third segment longer than

1. Ann. Belg. Ent. Soc., Vol. 45, p. 113.

2. Monograph of the British Aphides, Vol. II, p. 143.

spur and segment. Head broadly rounded, wing venation regular. Nectaries short and cylindrical, flanged at the end. Cauda broad and very short; antennæ, body and legs with many small tubercles, each one bearing a fine short hair.

CHAITOPHORINI.

Antennæ except in (*Sipha*) always six-segmented; in *Sipha* there are but five. Length variable, antennal tubercles wanting; antennæ, legs and body covered with hair-like bristles. Fore wings with two oblique veins and cubitus always twice forked; hind pair with two cross-veins. Nectaries variable in length and size, but never longer than one-tenth the length of the body. The genera in this tribe are somewhat similar to those in the tribe CALLIPTERINI, but are easily distinguished by the shorter and heavier antennæ and legs, as well as by the finer and more hair-like bristles.

Key to Genera.

1. Antennæ six segmented 2.
 Antennæ five-segmented 5.
2. Spur of sixth segment at least three times as long as the segment, and cauda knobbed at the tip 3.
 Spur of sixth segment not three times as long as the segment, and cauda broadly rounded and without a knobbed tip 4.
3. Spur of sixth segment not more than five times as long as the segment, nectaries not longer than the sixth segment, and cauda constricted *Arctaphis*.
 Spur of sixth segment more than five times as long as the segment, nectaries longer than the sixth segment, and cauda not constricted at base of knob *Chaitophorus*.
4. Antennæ nearly as long as the body, and spur of sixth segment shorter than sixth segment *Symdobius*.
 Antennæ about one-half the length of the body, and spur of sixth segment longer than the segment *Thomasia*.
5. Antennæ with but five segments and shorter than the body, nectaries very short and tapering, with a flanged mouth *Sipha*.

Arctaphis Walker.³

type *A. populi* Linn.

Antennæ six-segmented, shorter than the body, and without antennal tubercles; spur of sixth segment as long or longer than the third and

3. The Zoologist, 1870, p. 2000.

about five times as long as the sixth. Forehead broad and flat, body short and stout; wings long and slender. Nectaries very short and tapering, cauda a knob on quadrangular base. Anal plate broadly rounded.

Chaitophorus Koch.⁴

Syn. *Phyllophorus* Thornton.

Phyllophora Fernie.

Chelymorpha Lane Clark.

Periphyllus Van der Hoeven.

type *A. aceris* Linn.

Antennæ nearly as long as the body and on indistinct antennal tubercles. spur of sixth segment longer than the third, and about six times as long as the sixth segment. Head flat in front, eyes prominent; wing venation regular. Nectaries six times the length of the cauda, and constricted in the middle. Cauda very short, being but a knob. Antennæ, legs and body with long hair-like bristles.

Symdobius Mordwilko.⁵

type *A. oblongus* Heyden.

Antennæ nearly as long as the body, and not on antennal tubercles, spur of sixth segment shorter than segment, and much shorter than the third segment. Forehead flat, slightly elevated; body short and stout, wings long and slender. Nectaries not much longer than the cauda, tapering and slightly constricted in the middle. Cauda short and broadly rounded, anal plate indistinct. Tip of abdomen broadly rounded; legs, body and antennæ set with very fine hairs.

Thomasia, n. gen.

type *C. populicola* Thomas.

Antennæ much shorter than the body, and not placed on antennal tubercles. Spur of sixth segment longer than the segment, the third segment being longer than both together. Forehead broad, body short and robust. Wings long and slender; nectaries tapering and placed on a broad base, nectaries slightly longer than the sixth segment. Cauda short, thick and broadly rounded. Anal plate if present obscure; tip of abdomen broadly rounded, but with tip slightly flattened.

Sipha Passerini.⁶

type *A. glycerie* Kalt.

Antennæ with five segments, shorter than the body and not placed on antennal tubercles. Spur of fifth segment not longer than the segment,

4. Die Pflanzenläuse Aphiden, p. 1, 1854.

5. Rab. Lab. Zool. Kab. Imp., Varch. Univ., 1894 (K. Fauna and Anat. Sem Aphid, p. 54).

6. Gli Afidi, p. 28, 1860.

and both together shorter than the third segment. Body somewhat slender, wing venation regular. Nectaries are but wide raised bases, with a flange at the opening, cauda slightly longer than broad, with a wide elliptical tip. Body with many small tubercles, each one of which bears a stout tapering bristle. At this time there is but a single American species placed in this genus (*Sipha flavus* Forbes), which differs somewhat from the above. Above description taken from European specimens of the type species.

Tribe VACUNINI.

There are but two species belonging to this group, and while closely allied to one another, are separated from other groups by distinct characters. They are, however, distinct enough from each other to belong to separate genera, and have accordingly been separated, and their characters are very misleading. In general they seem to come closer to the Callipterus group, but the undeveloped antennæ and eyes seem to place them on a lower plane of organization. The apterous forms have dentate processes on the sides of the abdomen, and with the bristle-like hairs must belong close to *Sipha*, which seems to be the next step beyond. The antennæ are five-segmented, and not on antennal tubercles. The spur of the fifth segment is but a short nail-like process, the wings are undeveloped, and the nectaries are similar to *Sipha*. The apterous forms have undeveloped eyes, composed of but three ocelli to each one, and the ocelli are but red spots.

The two genera are distinguished as follows :

Cauda with a knob at the tip and longer than broad *Glyphina*.
Cauda blunt, broader than long, and not constricted *Vacuna*.

Glyphina Koch.⁷

Syn. *Thelexes* Buckton, p. p.

type *A. alni* Schrank.

Antennæ five-segmented, and shorter than one-half the length of the body. Spur of fifth but a small thumb-like process. Third segment the longest. Wings short and broad, veins heavy, and the median vein of the fore wing but once forked. Hind wing with but a single cross-vein. Nectaries slightly raised and shaped as in *Lachnus*. Cauda short, broad and rounded at the tip. Antennæ, legs and body set with short fine hairs. Apterous forms have numerous stout spicules, and the eyes are rudimentary.

7. Die Pflanzenläuse Aphiden, p. 259, 1854.

Vacuna Heyden.⁸

Syn. *Thelaxes* Buckton, p. p.

Cinara Mosley.

Antennæ five-segmented, and shorter than one-half the body length. Spur of sixth a thumb-like process, third segment the longest. Wings longer than in preceding genus, fore wings with median vein once forked, hind wing with but a single cross-vein. Nectaries like those of *Lachnus*, being cone-shaped, with a flange at the apex. Cauda short but longer than broad, and constricted into a knob at the tip. Antennæ, body and legs set with fine hairs.

Apterous forms with rudimentary eyes, and with a row of dentated processes along the sides of the abdomen.

TWENTY-THIRD ANNUAL MEETING AMERICAN ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.

The twenty-third annual meeting of the American Association of Economic Entomologists will be held in Minneapolis, Minnesota, December 28 and 29, 1910, in connection with the annual meeting of the American Association for the Advancement of Science. The exact time and place of holding the sessions, information concerning hotel headquarters, railroad rates, etc., will be forwarded to members as soon as the programme is made up.

The Association is assured a cordial welcome in Minneapolis, and the members are urged to be present and assist in making the meeting a pronounced success.

E. D. SANDERSON, *President*,

Morgantown, W. Va.

A. F. BURGESS, *Secretary*,

Melrose Highlands, Mass.

ENTOMOLOGICAL SOCIETY OF AMERICA, ANNUAL MEETING.

The fifth annual meeting of the Entomological Society of America will be held at Minneapolis on Tuesday and Wednesday, December 27th and 28th, in connection with the meeting of the American Association for the Advancement of Sciences. It is proposed to hold a joint session with American Association of Economic Entomologists on the afternoon of Wednesday, December 28, and an interesting programme is assured. The annual address will be given by Prof. F. L. Washburn on Wednesday evening, on "The Typhoid Fly on the Minnesota Iron Range."

C. R. CROSBY, *Secretary-Treasurer*.

8. Museum Senkenberg, II, p. 289, 1837.

THE GENERIC AND SUBGENERIC TYPES OF THE *LYTTIDÆ*
(*MELOIDÆ* S. *CANTHARIDÆ* AUCTT.), (COL)

BY CREIGHTON WELLMAN, B.A., M.D., F.E.S., OAKLAND, CALIFORNIA.

It is not the writer's intention in proposing generic types for the blister beetles to engage in a general discussion of the laws of zoological nomenclature, but a brief outline of the principles which have been followed is not out of place.

Types have been justly called the "anchors" of genera. In order to avoid unnecessary changes in nomenclature and to obviate irritating doubt as to the limits of groups, it is necessary that types for existing zoological genera be fixed as rapidly as possible, and that authors of new genera should clearly designate type species of the same. It is to be hoped that systematic workers in special groups will speedily publish the types of all the genera familiar to them.

In my study of the genera of the Coleopterous family Lyttidæ, I have been able, by applying the rules laid down in the International Code,¹ to name type species for many of the genera and subgenera thus far proposed. For various reasons I decline at present to name types for several genera, but subsequent study may render this possible.

Regarding the spelling of generic names, I should perhaps say that I do not at present admit the duty or privilege of a succeeding writer to "correct" the orthography or etymology of the author of a genus. I also regard misprints as having a nomenclatorial status, and believe that they should be listed as synonyms.

In designating generic types, it is necessary to include discarded genera and those existing only in synonymy, as well as those adopted by zoologists, because a species once used as a type cannot subsequently be made to serve for a different genus.

In the earlier literature especially, it is extremely difficult always to determine whether an author intends to indicate a type species or not, but it is important to endeavour to decide this before naming the type, because a type once properly designated in the literature cannot be subsequently changed. It, of course, follows from this that if a type be selected for a genus which has previously had its type species properly named (either by the proposer of the genus or by a subsequent author), the last designation, unless it coincide with the original and valid one, is not to be regarded. I

1. The International Code of Zoological Nomenclature, 1905.
December, 1910

hope I have escaped such solecisms, but it is very hard to be entirely certain in a few instances, and I shall be grateful to any one who will point out such instances in my work.

The following quotations from Stiles and Hassall's interpretation of the International Code of Zoological Nomenclature² contain the axioms by which I have been principally guided in proposing types for the genera of Lyttidæ :

1. I regard "the practice of failing to designate the type species (of genera) as one of the most fruitful sources of confusion in systematic literature." (Page 10.)

2. "Types should be determined for all generic names as soon as possible, since a generic name without a definitely-established type is always an element of danger in both systematic and bibliographic zoology." (Page 11.)

3. "The adoption of a rule by the International Commission on Zoological Nomenclature, to the effect that no new generic name may demand recognition unless the author definitely fixes the type at its original publication is worthy of serious consideration." (Preface by Salmon.)

4. "When, in the original publication of a genus, one of the species is definitely designated as type, this species should be accepted (by the later author who is selecting types) as type, regardless of any other considerations." (Page 30.)

5. "If a genus, without designated type, contains among its original species one possessing the generic name as its specific or subspecific name, either as a valid name or synonym, that species or subspecies becomes *ipse facto* type of the genus." (Page 32.)

6. "If an author, in publishing a genus with more than one valid species, fails to designate or to indicate its type, any subsequent author may select the type, and such designation is not subject to change." (Page 52.)

7. "A genus proposed with a single original species takes that species as type." (Page 25.)

8. In selecting types not subject to the foregoing rules the following principles have been followed :

2. The Determination of Generic Types, Washington, 1905.

(a). "In case of Linnæan genera, select as type the most common or the medicinal species." (Page 56.)³

(b). "If the genus contains both exotic and nonexotic species from the standpoint of the original author, the type should be selected from the nonexotic species, unless such procedure is contraindicated by the original author's intentions." (Page 58.)

(c). "All other things being equal, page precedence should obtain in selecting a type." (Page 56.)

(d). "Show preference to the best described, best figured, best known, most easily obtainable species, or of which a type specimen can be obtained." (Page 56.)

9. I hold "for the adoption of the original published orthography (of generic names), be it good, bad or indifferent (and agree), in proposing that all names incorrectly written should be construed under Article 8k, of the International Code, as 'arbitrary combinations of letters.'" (Page 76.)

10. It seems to me a just ruling that published misprints, etc., should be accorded a definite nomenclatorial status, "and are therefore subject to citation, and should be listed." (Page 78.)

Following is a list of the genera and subgenera of the blister beetles so far as I have been able to select their type species in harmony with the foregoing principles. In the first group I include the genera, unfortunately few, of which the type is unequivocally fixed by original designation (either direct or implied) by the author of the genus. (Rule 4, *supra*.)

Alosimus Mulsant, 1857, type species *syriacus* Linné, 1758. In the original description of his genus the author mentions by name only one species as coming under it, namely, *syriacus* L., which therefore must be considered as the type of the genus.

Cerocoma Geoffroy, 1762, type species *schæfferi* Linné, 1758. Geoffroy definitely refers to the page and number of Linné's species.

Cysteodemus LeConte, 1851, type species *armatus* LeConte, 1851, virtually designated by author of genus.

Gynecomeloe Wellman, 1910, type species *opacus* G. H. Horn, 1867, formally designated by author of genus.

3. Si genus receptum, secundum jus naturæ et artis, in plura dirima debet, tum nomen antea commune manebit vulgatissimæ et officinali plantæ." *Philosophia Botanica*, 1751, p. 197. This Linnæan rule for botanical names has, by common consent, been recognized as valid in zoology also. (Cf. page 12.)

Iselma Haag-Rutenberg, 1879, type species *ursus* Thunberg, 1791, virtually designated, as the species is named by the author in the title of the description of his genus.

Megeria LeConte, 1859, type species *cancellata* Brandt et Erichson, 1832, practically designated by author of genus, as he considered the only other species (*vittata*) as possibly only a variety of *cancellata*.

Micromerus Mulsant et Rey, 1858, type species *collaris* Fabricius, 1787, virtually designated by authors of genus.

Fleuropasta Wellman, 1909, type species *mirabilis* G. H. Horn, 1870, formally designated by author of genus.

Sagitta Escherich, 1894, type species *angusticollis* Haag-Rutenberg, 1880, virtually designated in original description as type of genus.

Tricraniodes Wellman, 1910, type species *stansburii* Haldeman, 1852, formally designated by author of genus.

In the second group, according to the principle of type by tautonymy (Rule 5 *suprà*), we may designate :

Proscarabæus Leach, 1832, type species *proscarabæus* Linné, 1758.

Under the next group are listed those cases falling under rule 6 (*Vide suprà*). It is a relief in more or less doubtful cases to find types designated by a writer subsequent to the original author of a genus. In the present family we find some such instances as :

Cabalia Mulsant et Rey, 1858, type species *segetum* Fabricius, 1792 (cf. Escherich Verh. k. k. zool.-bot. Gesell., Wien, 1894, p. 45).

Cissites Latreille, 1807, type species *maculata* Swederus, 1787. (Cf. Gahan, Ann. Mag. Nat. Hist., 1908, p. 199 f.)

Euzonitis Semenow, 1893, type species *sexmaculata* Olivier, 1791 (cf. Escherich Verh. naturf. Verh. Brünn., 1897, p. 103).

Horia Fabricius, 1787, type species *testacea* Fabricius, 1787. (Cf. Gahan, l. c.)

Lagorina Mulsant et Rey, 1858, type species *sericea* Walth., 1835 (cf. Escherich, l. c., p. 20).

Lydus Megerle, 1829, type species *algericus* Linné, 1758 (cf. Escherich Deutsch, Ent. Zeit., 1896, p. 193).

Lytta Fabricius, 1775, type species *vesicatoria* Linné, 1758. The Linnæan rule (8a *suprà*) would have fixed the type of this genus could the Linnæan name *Cantharis* have been retained. Still *vesicatoria* has by several authors (v. Escherich, Ver. k. k. zool.-bot. Gesell., 1894, p. 19) been designated as the type of the genus *Lytta* F.

Enas Latreille, 1802, type species *afcr* Linné, 1767 (c.f. Guérin-Ménéville, Dict. pitt. d'Hist. nat., v. 6, I, 1833, p. 224).

Sitaris Latreille, 1802, type species *humeralis* Fabricius, 1775 (= *muralis* Forster, 1771), (cf. Guérin-Ménéville, Dict. pitt. d'Hist. nat., v. 9, I, 1833, p. 69).

Tricrania LeConte, 1860, type species *sanguinipennis* Say, 1823 (cf. Wellman, Ent. News, XXI, 1910, p. 219).

Zonitis Fabricius, 1775, type species *præusta* Fabricius, 1792 (= *flava* Fabricius, 1775), (cf. Guérin-Ménéville, Dict. pitt. d'Hist. nat., v. 9, II, 1833, p. 593, vid also Escherich, Verh. Naturf. Ver. Brünn, 1897, p. 104).

A considerable number of monotypical genera (Rule 7 *supra*) are to be recorded as follows:

Anisarthrocera Semenow, 1895, type species *batesi* Marseul, 1872.

Apalus Fabricius, 1775, type species *bimaculatus* Linné, 1746.

Apterospasta LeConte, 1866, type species *segmenta*, Say, 1823.

Caloenas Reitter, 1889, type *pulcher* Reitter, 1889.

Calospasta LeConte, 1866, type species *elegans* LeConte, 1851.

Calydus Reitter, 1896, type species *pulcher* Reitter, 1889.

Causima Lacordaire, 1859, type species *vidua* Klug, 1825.

Cochliophorus Escherich, 1891, type species *reitteri* Escherich, 1891.

Ctenopus Fischer de Waldheim, 1824, type species *melanogaster* Fischer de Waldheim, 1824.

Cordylospasta G. H. Horn, 1875, type species *fulleri* G. H. Horn, 1875.

Corioligiton Marseul, 1879, type *hilaris* Mars., 1879.

Deratus Motschulsky, 1872, type *tibialis* Motschulsky, 1872.

Deridea Westwood, 1875, type species *curculionides* Westwood, 1875.

Diaphorocera L. von Heyden, 1863, type species *Hemprichi* L. von Heyden, 1863.

Eletica Lacordaire, 1859, type species *rufa* Fabricius, 1801.

Eupompha LeConte, 1858, type species *fissiceps* LeConte, 1858.

Goëtymes Pascoe, 1863, type species *flavicornis* Pascoe, 1863.

Gnathium Kirby, 1818, type species *francilloni* Kirby, 1818.

Gnathospasta G. H. Horn, 1875, type species *mimetica* G. H. Horn, 1875.

Gynapteryx Fairmaire et Germain, 1863, type species *flavocinctus* Fairmaire et Germain, 1863.

- Henous* Haldeman, 1852, type species *confertus* Say, 1823.
Hoplozonitis Blackburn, 1872, type species *mira* Blackburn, 1872.
Hornia Riley, 1877, type species *minutipennis* Riley, 1877.
Iodema Pascoe, 1860, type species *clarki* Pascoe, 1860.
Leonia E. Duges, 1889, type species *rileyi* E. Duges, 1889.
Leptopalpus Guérin-Ménéville, 1829, type species *rostratus* Fabricius, 1775.
Lydoceras Marseul, 1870, type species *fasciata* Fabricius, 1775.
Lydomorphus Fairmaire, 1882, type species *cinnamomeus* Fairmaire, 1882.
Lydulus Semenow, 1893, type species *albopilosus* Semenow, 1893.
Lyttonyx Marseul, 1876, type species *bilateralis* Marseul, 1876.
Meloctyphlus C. O. Waterhouse, 1872, type species *fuscatus*, C. O. Waterhouse, 1872.
Mimesthes Marseul, 1872, type species *maculicollis* Marseul, 1872.
Negalius Casey, 1891, type species *marmoratus* Casey, 1891.
Nomaspis LeConte, 1866, type species *parvula* Haldeman, 1852.
Onyctenus Serville, 1825, type species *sonnerati* Serville, 1825.
Palestra Castelnau, 1840, type species *rubripennis* Castelnau, 1840.
Palastrida White, 1846, type species *bicolor* White, 1846.
Paroenas Kolbe, 1894, type species *limbata* Kolbe, 1894.
Picnoscus Solier, 1851, type species *flavipennis* Guérin-Ménéville, 1844.
Phodaga LeConte, 1858, type species *alticeps* LeConte, 1858.
Pleuropompha LeConte, 1867, type species *costata* LeConte, 1867.
Foreospasta G. H. Horn, 1867, type species *polita* G. H. Horn, 1867.
Pseudabris Fairmaire, 1894, type species *tigriodera* Fairmaire, 1894.
Rampholyssa Kraatz, 1863, type species *steveni* Fischer von Waldheim, 1824.
Sitarida White, 1846, type species *hopei* White, 1846.
Sitarobrachys Reiter, 1883, type species *brevipennis*, 1883.
Sitaromorpha Dokhtoureff, 1890, type species *wilkinsi* Dokhtoureff, 1890.
Stenodera Escholtz, 1818, type species *sexmaculata* Fabricius, 1794 (= *caucasica* Pallas, 1781).
Stenoria Mulsant et Rey, 1857, type species *apicalis* Latreille, 1804.
Sybaris Stephens 1832, type species *immunis* Stephens, 1832.

Tegrodera LeConte, 1851, type species *erosa* LeConte, 1851.

Tetraonyx Latreille, 1833, type species *octomaculatus* Latreille, 1833.

Tmesidera Westwood, 1841, type species *rufipennis* Westwood, 1841.

Triodous E. Duges, 1889, type species *cordilleræ* Chevrolat, 1843
(= *lævis* Leach, 1815), 1829.

Zonitoides Fairmaire, 1883, type species *megalops* Fairmaire, 1883.

This name is a homonym of *Zonitoides* Lehm., 1862, a valid genus of Mollusca, and therefore must be changed. I propose the following in its stead:

Zonitopsis Wellm., 1810, nom. nov.

The only Linnæan genus may be fixed according to the Linnæan maxim (Rule 8a *suprà*), as follows:

Meloë Linné, 1758, type species *majalis* Linné, 1758. This is fortunate, as the only other Linnæan species of true *Meloë* was subsequently used by Leach as the type of his genus *Proscarabeus*. The winged insects listed by Linné under the 1758 description of the genus *Meloë* have also, with one exotic exception (*Myiabris*) *cichorii*, since been used as types of the genera *Lytta*, *Alosimus*, *Lydus*, *Cerocoma* and *Myiabris*. Consequently, according to Stiles and Hassall's interpretation of the International code (page 58,⁴ cf., also Rules 8a and 8b *suprà*), there is happily no doubt whatever regarding the type species of the genus *Meloë* Linné, 1758.

The remaining genera may have their types chosen or tentatively indicated mostly under rules 8b, 8c and 8d (*suprà*). Where I prefix a mark of interrogation the citation should be interpreted as only meaning that the species named is, according to my present knowledge, probably the one which should be taken as type. Thus, such genera remain for any author to select their types subsequently. I quote in this connection from Stiles and Hassall,⁵ who say under similar circumstances: "The action on these cases in the present paper is not to be interpreted as *designation of type*, but simply as an indication of the species which, other things being equal, it seems best (so far as data are accessible at the present moment) to select." The few genera not discussed in this paper will be made the subject of a subsequent note.

4. "Any species of a genus which has been selected to serve as type for a later genus is excluded from consideration in selecting the type of the earlier genus."

5. *Op. cit.*, p. 11.

Actenodia Castelnau, 1840, type species ? *decimiguttata* Billberg, 1813 (= *guttata* Castelnau, 1840).

Apalus Fabricius, 1775, type species *bimaculatus* Fabricius, 1761.

Ceroctis Marseul, 1872, type species *serricornis* Gerstäcker, 1854.

Coryna Billberg, 1813, type species ? *hermanniae* Fabricius, 1775.

Criolis Mulsant, 1858, type species ? *guerini* Mulsant, 1858.

Decatoma Castelman, 1840, type species ? *lunata* Pallas, 1781.

Epicauta L. Redtenbacher, 1845, type species ? *erythrocephala* Pallas, 1771.

Glasunovia Semenow, 1895, type species *caspica* Semenow, 1895.

Isopentra Mulsant, 1858, type species ? *megalcephala* Gebler, 1817.

Macrobasis LeConte, 1862, type species *albida* Say, 1828.

Mylabris Fabricius 1775, type species ? *floralis* Pallas, 1781.

Nemognatha Illiger, 1807, type species *chrysomelina* Fabricius, 1775.

Prionotus Kollar et Redtenbacher, 1842, type species *præustus* Kollar et Redtenbacher, 1842.

Pseudomeloe Fairmaire et Germain, 1863, type species ? *anthracinus* Fairmaire et Germain, 1863 (= *parvus* Gay, 1851).

Spastica Lacordaire, 1859, type species *flavicollis* Chevrolat, 1838.

Teratolytta Semenow, 1894, type species *dives* Brullé, 1832.

Treiodous E. Duges, 1870, type ? *barranci* E. Duges, 1870 (= *lævis* Leach, 1815).

Zonitides Abeille de Perrin, 1880, type ? *oculifera* Abeille, 1880.

In conclusion, it may be said that there has been no need to mention pure nomenclatorial synonyms in the foregoing paper, as a *nomen novum* for a genus of course carries with it the name of the type of the genus for which the new name is proposed. It will also be noticed that the genera proposed in Dejean's Catalogues have been ignored except when such may be fairly attributed to a later author. In my forthcoming catalogue of the species of this family I am likewise dropping all citations of the works mentioned, as these names were not accompanied by descriptions. I cannot accord such a name any other status than that of a *nomen nudum*. While there is no objection to mentioning a published *nomen nudum* or a name *in literis* in connection with a description for the convenience of collectors in comparing their material similarly named, yet the conservation of these names in nomenclature serves only to perpetuate confusion.

THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The forty-seventh annual meeting of the Society was held at the Ontario Agricultural College, Guelph, on Thursday and Friday, November 3rd and 4th. Professor Tennyson D. Jarvis, President of the Society, occupied the chair during the day meetings, and at the evening session the meeting was presided over by Mr. C. C. James, Deputy Minister of Agriculture for Ontario.

Amongst those present were Mr. H. H. Lyman, Montreal; Dr. C. G. Hewitt, Mr. Arthur Gibson and Mr. Groh, Central Experimental Farm, Ottawa; Prof. Swaine, Macdonald College, St. Anne's, P. Q.; Mr. John D. Evans and Miss Evans, Trenton; Mr. F. J. A. Morris, Trinity College School, Port Hope; Dr. E. M. Walker, and Messrs. C. W. Nash, J. B. Williams and A. Gummer, Toronto; Prof. Needham, Cornell University, Ithaca, N. Y.; President Creelman, Professors C. A. Zavitz, W. H. Day, S. F. Edwards, E. J. Zavitz, C. J. S. Bethune, Messrs. J. E. Howitt, J. W. Eastham, L. Cæsar, D. H. Jones, Morley Pettit, of the staff; and a number of the students of the Ontario Agricultural College.

On Thursday morning a meeting of the Council was held, at which the report of the proceedings during the past year was drawn up, and several questions concerning the welfare of the Society were discussed. Amongst others, was the consideration of a proposal to hold the next annual meeting at either Macdonald College, P. Q., or the Experimental Farm at Ottawa. This was referred to the Executive Committee for further action. Dr. Bethune was elected a Life Member in recognition of his services to the Society since its inception 47 years ago.

In the afternoon the proceedings began with the reading of reports by the following Directors on the insects observed in their respective districts during the year: Mr. A. Gibson, Ottawa; Mr. C. E. Grant, Orillia; Mr. J. B. Williams, Toronto; Mr. F. J. A. Morris, Port Hope; Mr. R. S. Hamilton, Galt; and Mr. R. C. Treherne, Grimsby. Mr. L. Cæsar gave a paper on "The Insects of the Year in Ontario," and was followed by Dr. Hewitt, who gave an account of the "Most Injurious Insects in Canada during the Year 1910." These papers were discussed in an interesting manner by a number of those present. The reports of the Montreal and Toronto Branches, and of the Treasurer, Curator and Librarian of the Society were read and accepted.

In the evening a public meeting was held in Massey Hall auditorium, which was well attended by students of the College, as well as members of the Society. Professor Needham gave a particularly interesting and

instructive address, illustrated by a series of beautiful lantern pictures, on "The Role of Insects in Water Life." Mr. James, who presided, expressed the pleasure that he and all present had derived from the address, and the surprise that all shared in at the importance of aquatic insects as regards the provision of food for fishes. President Creelman moved a vote of thanks to the lecturer, which was seconded by Dr. Hewitt. The enjoyment of the evening was much enhanced by several musical selections given by students of the College.

During the second day, Friday, November 4th, a meeting was held during the morning in the Museum of the Biological Department, where members exhibited and examined a large number of interesting specimens which were contributed from various quarters.

In the afternoon a large number of papers were read and discussed: "The Spread of Diseases amongst Plants, Animals and Man by Acarids," by Professor Jarvis; a delightful paper on "Leaf-eating Beetles," by Mr. F. J. A. Morris; "Collecting in the White Mountains," by Mr. H. H. Lyman; "The Bean Maggot in Ontario in 1910," by Mr. J. E. Howitt; "Notes on Some Insects of 1910," and a charming paper on "The Pool," by Dr. T. W. Fyles; "The Horse-radish Flea-beetle," by Mr. A. F. Winn; "Further Notes on Basswood Insects," and "The Entomological Record for 1910," by Mr. A. Gibson; "Some Observations on the Practical Importance of Parasitic Insects," and "Parthenogenesis among Bees," by Dr. Hewitt; "Notes on the Breeding of *Tropidopria conica*," by Mr. G. E. Sanders, of Ottawa; "Scolytid Beetles attacking the Larch and other Forest Trees," by Prof. Swaine; "The Migration of some Native Locusts in Manitoba," by Mr. Norman Criddle. These papers were discussed by many of those present, and will be published in full in the forthcoming annual report.

The election of officers for the ensuing year resulted as follows:

President—Dr. Edmund M. Walker, Lecturer in Biology, University of Toronto.

Vice-President—Dr. C. Gordon Hewitt, Dominion Entomologist, Central Experimental Farm, Ottawa.

Secretary-Treasurer—Mr. J. Eaton Howitt, M. S. A., Lecturer in Botany, O. A. College, Guelph.

Curator—Mr. Lawson Caesar, B. A., B. S. A., Lecturer in Entomology and Plant Diseases, O. A. College.

Librarian—Rev. C. J. S. Bethune, M. A., D. C. L., F. R. S. C., Professor of Entomology and Zoology, O. A. College.

Directors—Division No. 1, Mr. Arthur Gibson, Dept. of Entomology, Central Experimental Farm, Ottawa; Division No. 2, Mr. C. E. Grant, Orillia; Division No. 3, Mr. A. Cosens, Parkdale Collegiate Institute, Toronto; Division No. 4, Mr. C. W. Nash, East Toronto; Division No. 5, Mr. F. J. A. Morris, Trinity College School, Port Hope; Division No. 6, Mr. R. S. Hamilton, Collegiate Institute, Galt; Division No. 7, Mr. R. C. Treherne, Grimsby.

Delegate to the Royal Society—Prof. J. M. Swaine, Macdonald College, P. Q.

Auditors—Professors S. B. McCready and J. W. Crow, O. A. College, Guelph.
C. J. S. B.

ON PROFESSOR SMITH'S TREATMENT OF THE FORMS OF GRAPHIPHORA (TENIOCAMPA) ALLIED TO HIBISCI, GUENEE.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Prof. John B. Smith's article on certain species of *Teniocampa* (recte *Graphiphora* Hubn.) should not pass unnoticed. We may be mistaken, but it appears as if it were written because Mr. Dod had ventured to have an opinion on the subject, and this was intended to overwhelm him with a quantity of new names and figures of genitalia. If so, Prof. Smith has overreached himself and landed in the synonymy. We have taken the pains to prepare slides of the genitalia of all the principal forms of the *Graphiphoras* under *hibisci* and *pacifica* in the collection of the National Museum, and are in a position to state that Prof. Smith's figures 1, 2 and 3 represent one form only, his figures 5, 6 and 7 another, while figure 4 represents a doubtful third, and figure 8 a good fourth. In short, the apparent differences in the figures represent variation, differences in position, and the accidents of drawing. If Prof. Smith had put the real differences into words in tabular form, this would have been evident, even if perhaps not suitable to his purpose. The *hibisci* type has the harpes broad, the clasper evenly curved like a sickle; the *quinquefasciata* type has the harpes narrowed, the clasper crumpled or sharply bent. *Nubilata* is a derivative of the *quinquefasciata* form, and I tentatively leave it separate. *Pacifica* is abundantly distinct.

The differences of method between Mr. Dod and Prof. Smith make an interesting comparison. Mr. Dod depends upon the markings and coloration of the insects, Prof. Smith upon the structure of the genitalia. Prof. Smith's method sounds the more reliable, yet Mr. Dod is the one who is right in his conclusions. Mr. Dod makes one species with varieties,

where Prof. Smith makes seven species. The discrepancy is due to an erroneous assumption by Prof. Smith, that any slight difference in the genitalia indicates a different species. This is not so. I do not belittle the importance of the male genitalia in the Noctuidæ. They are important. But the structures are very flexible from an evolutionary point of view, and slight modifications in them are not necessarily indicative of specific separation, but of racial separation only, especially if correlated with geographic distribution. Thus, the *hibisci* form extends into Colorado and the Northern Rockies, as far at least as Rossland, B. C., whence I have it. Here it becomes the form *latirena* Dod. The genitalia are unchanged. But on the west coast the race *quinquefasciata* prevails, with a slight modification in the genitalia. This race has crossed into the Western Rockies, producing the form *nubilata*, which constitutes an incipient species.

It is necessary to notice two nomenclatorial errors of Prof. Smith. First, he gives *instabilis* Fitch (1856) precedence over *hibisci* Guenée (1852), which is wrong. It does not matter whether *hibisci* is an aberrational form or the usual one for establishing the name. Only the dates of publication count. Second, there is no such species as *instabilis* Fitch. Fitch used Schiffermüller's name in error for the American representative. Misidentifications cannot be made the basis of any new name.

This synonymy will stand as follows. It is as given by Mr. Dod, with Prof. Smith's new synonyms added.

GRAPHIPHORA HIBISCI Guen.

confluens Morr.

var. *LATIRENA* Dod.

brucei Smith.

malora Smith.

var. *QUINQUEFASCIATA* Smith.

inflata Smith.

inherita Smith.

proba Smith.

? *G. NUBILATA* Smith.

G. PACIFICA Harv.

NOTES ON LIFE-HISTORY OF ANISOTA SKINNERI, BIED.

BY WILLIAM BARNES, M. D., AND J. MCDUNNOUGH, PH. D.

In the original description of this species (Ent. News, XIX, 77) a very brief account of the larval stages is given, but as far as we know no

detailed description has yet been published. In the fall of 1909 we received from Ft. Wingate, N. M., a number of pupæ of this species, which began to emerge about the middle of April, 1910. The time of emergence is usually towards noon, and in the early afternoon the males commence their flight. Our first attempts to secure a pairing were futile, but on experimenting further it was found that freshly-emerged males copulated very readily with females that had emerged the previous day. From two such pairings a large number of ova were secured, oviposition lasting over a period of a week, and being in each case practically complete; the number of ova laid by a single female is in the neighbourhood of 300. The duration of the egg stage is about two weeks, the young larvæ on hatching feeding readily on oak and reaching maturity in from four to five weeks. Pupation takes place, as in all the members of this group, in the ground. A very small proportion of the brood emerged after a short pupal duration of about three weeks, these being all females: the remainder are at the time of writing still pupæ, and will probably hibernate as such. Whether in their natural condition there are normally two broods we do not know, but consider it very probable from the fact that Biederman mentions obtaining ova the latter part of August. Following is a more detailed account of the various stages:

Ova.—Smooth, flatly elliptical, pale yellow; dimensions, 2 mm. \times 1.7 mm. \times 1.2 mm.

Stage I.—Head oval, with a few short setæ; width, .8 mm. Body on first hatching yellowish, later greenish-gray, with smooth skin and black primary tubercles. The prothorax contains a narrow cervical plate of a slightly darker colour than the surrounding area, on the anterior margin of which are placed four small rounded black tubercles, each with two setæ. On mesothorax tubercles i and ii appear to have united to form a spine .8 mm. long, from the apex of which two fine setæ arise: on metathorax the position of tubercles i and ii is occupied by a small conical tubercle with two setæ. Tubercle iii on both segments also possesses two setæ, whereas iv shows but one. On the abdominal segments, with the exception of the 9th, both tubercles i and ii are present, i being much the larger: each has but one seta. Tubercle iii arises from the anterior margin of the segment directly above spiracle, whilst iv is well below lateral fold of skin, and rather minute. On the thoracic and first two abdominal segments there is also a fifth small tubercle, placed rather ventrally. The 9th abdominal segment contains dorsally but one tubercle placed in the central line, and rather larger than the preceding ones. Laterally the

position of iii is occupied by a very minute tubercle, whilst ventrad and posterior to this a tubercle corresponding in size to iii of other abdominal segments is present, preceded on the anterior margin by another minute tubercle. Anal plate heart-shaped, bordered with several seta-bearing tubercles. Legs black. Prolegs with prominent lateral chitinous plate, especially well developed on anal claspers. Length, 3 mm.

Stage II.—Head red, oval, the lobes extending dorsally much above the clypeus, which is quite small. Between the lobes is a distinct suture : width of head, 1.5 mm. Body cylindrical, olive brown, turning later red-brown ; skin granulated ; all tubercles and spines shiny black ; cervical plate usually, anal plate always black. The mesothoracic spine is now 2.3 mm. long and covered with minute bristles, the apex is slightly bifurcate, but the long setæ of previous stage are lacking. Tubercle i is represented by a double row of short conical, sharply-pointed spines along the dorsum, ending with a single one on the 9th abdominal segment ; of these the pair on the metathorax are slightly larger than the others. Tubercle ii is very minute and scarcely visible ; other tubercles conical, smaller than i. Spiracle round, black ; anal plate, legs and prolegs as in preceding stage. Length, 9 mm.

Stage III.—Head orange-red, with fine network of darker lines, sparsely covered with very minute setæ. Width, 2.3 mm. Body brick-red ; skin granulated, with a well developed lateral fold ; cervical plate black, well defined, with the four tubercles of previous stages and numerous other minute black granules. Mesothoracic spine slightly recurved, 5.5 mm. long, covered with short secondary spines ; the dorsal rows of spines are also slightly spiculate near their bases ; tubercle ii has now practically disappeared, and can scarcely be distinguished from the granulations ; other spines short, conical, slightly spiculate ; dorsal spine of 9th abdominal very prominent ; anal plate fringed laterally by row of spines ; spiracles oval, black, with small central slit. Prolegs with several minute black tubercles on the upper portion and black lateral plate, which is much reduced on anal claspers, being restricted to small patch on anterior margin. Length, 19 mm.

Stage IV.—Head as in previous stage, with deep furrow between lobes ; width, 3.2 mm. Body brick-red, granulate. The cervical and anal plates are no longer black, but of same colour as body, and not very apparent. In late stages traces of a yellow subdorsal stripe, situated laterad of tubercle i, and yellow patches about spiracles, are present. Mesothoracic spine 8 mm. long, strongly spiculate ; other spines as in

previous stage, slightly more spiculate and very sharply pointed; spines i and iv longest, about .7 mm. long, iii short; on abdominal segments a minute black tubercle occupies the place of v (*i. e.*, well ventrad of iv), but is not present on thoracic segments; several other minute spines are situated in a row at base of prolegs; on the thoracic segments and those abdominal ones without prolegs, a large spine (vi?) occupies a similar position, being accompanied on 1st and 2nd abdominal segments by a smaller spine slightly anterior and ventrad to it. Spines of anal plate much reduced, only one pair, situated laterally, being black. Prolegs as before, and claspers entirely without black plate. Length, 38-50 mm., presumably according to the future sex.

Stage V.—Head reddish-brown, shiny, slightly furrowed and sparsely covered with very minute setæ; width, 4.5 mm. Body dark brick-red, very strongly granulate, with broken yellow subdorsal and spiracular stripes, the latter being chiefly confined to a yellow patch about spiracle. Tubercles of prothorax blunt, rounded; mesothoracic spine slightly recurved, blunt at apex, spiculation much reduced; length, 5.5 mm., all other spines sharply pointed and directed backwards, being shiny black and practically smooth, the spiculations of previous stages being obsolete. Length of spine i, 1.5 mm. Tubercle ii is again visible as small black spine: other tubercles as before. Numerous small black secondary spines are now present on anterior margin of each segment, forming a group anterior to iv, another below this tubercle and a band across base of prolegs, or in the case of the thoracic and first two abdominal segments, a group around the extra spine peculiar to these segments. Spiracle black; legs pale red, prolegs and anal clasper and plate as in previous stages. Length, 50-65 mm.

MELITÆA ALMA STRECKER, AND ITS SYNONYMY.

BY KARL R. COOLIDGE, PASADENA, CALIF.

Strecker, in his *Rhopalocera Heterocera*, etc., p. 135, 1878, described *Melitæa alma* from two specimens, one from Arizona and the other from Southern Utah. On Pl. XV a ♂ is figured above and below. There appears to be very little in our literature concerning *alma*. Holland, Butt. Bk., says: "The specimens I have come from Death Valley." He figures a male, fig. 1, on Pl. XVII, which is certainly a puny individual, if it is *alma* at all. Mr. W. G. Wright, Butt. West Coast, p. 102, 1905, says

of *alma*, that "only one male and one female known." Dr. Barnes, Ent. News. p. 329, 1900, writes that "examples from Durango, Colo., do not differ from those taken in Utah and Arizona."

Melitæa fulvia Edwards.—Originally published in the Trans. Amer. Ent. Soc., Vol. III, p. 191, 1879, and is known to occur in Texas, New Mexico and Colorado. Holland, Pl. XVI, fig. 17, gives a good representation of the ♂, but no reference is made to *fulvia* in the text. Dr. Skinner, Suppl. Cat., p. 9, 1904, remarks that "*fulvia* and *alma* are probably identical." This is certainly correct. Dr. Dyar, Bu. 52, U. S. Nat. Mus., makes *fulvia* a synonym of *theona* Menetries, but to which it bears little affinity, *theona* being identical with *thekla* Edwards (= *bollii* Edwards), and has priority. I have seen in the collection of Mr. Victor L. Clemence quite an extensive series of *alma*, taken in the Chiricahua Mountains of Cochise County, Arizona, and during the past season I took a few specimens in the Huachuca Mountains of the same county. Great variation is displayed as to the coloration, in some the ground colour being bright fulvous, and from this it varies to black. Strecker's types were unfortunately of the fulvous type.

Melitæa cyneas Godman and Salvin.—Biol. Cent. Amer., Rhop., Vol. I, p. 191, 1882. Described from Oaxaca, Mexico, and in the supplement, p. 677, 1900, Vol. 2, is reported further from Durango City, Pinal, Puebla, and from Pinos Altos, in Chihuahua. The authors remark that "this species and the next belong to a group of *Phyciodes*, represented in North America by *P. leanira* (Feld) and by *P. fulvia* (Edw.), one of the distinguishing characters of which is a dark band across the secondaries, in which is a series of yellow spots." The figures of *cyneas* on Pl. XXI, figs. 10, 11, show that it is absolutely identical with *alma*. *M. cynisca* Godman and Salvin is also very probably another synonym of *alma*. Dr. Skinner, Suppl. Cat., p. 9, 1904, lists *cyneas* from Arizona, and Wright figures a female from the Huachuca Mountains.

The present synonymy is then as follows.

Melitæa alma Strecker.

syn. *fulvia* Edwards.

cyneas Godman and Salvin.

Dist.—California, Arizona, Utah, New Mexico, Colorado and Mexico.

Mailed December 15th, 1910.

INDEX TO VOLUME XLII.

- Acantholyda Kincaidi*, 217.
Acrolophitus hirtipes, 272.
Acylopus ergoti, 231.
Ageneotettix Scudderi, 276.
Akentetus unicolor, 273.
 ALDRICH, PROF. J. M., article by, 99.
Aleyrodes ambrosiæ, n. sp., 370.
 " *ursorum*, n. sp., 171.
 American Association of Economic Entomologists, 94, 388.
Amphitornus Coloradus, 273.
Anabrus longipes, 353.
 " *simplex*, 353.
Andrena ampliflata, n. sp., 368.
 " *clypeonitens*, 160.
 " *Peckhami*, 159.
 " *phocata*, n. sp., 369.
 " *Whecleri*, n. sp., 369.
Anisandrus, table of American species, 165.
Anisota Skinneri, notes on life-history of, 400.
Anisotoma antennata, n. sp., 6.
 " *ecarinata*, 6.
 " *obsoleta*, 7.
 " *sculpturata*, n. sp., 6.
 " *similis*, n. sp., 5.
Anisotomini, new Silphidæ of the tribe, 4.
Annectus pallidus, n. sp., 166.
Anoplolyda sæva, n. n., 218.
Anthidium Chippewense, n. sp., 157.
Anthrax Nemakagonensis, n. sp., 26.
 Ants, from Steamboat Springs, Col., 370.
Apantesis toæle, n. sp., 208.
 " *ab. ophir*, n. ab., 209.
Aphrophorias, n. n., 63.
Apote notabilis, 353.
Arctaphis, characters of, 385.
Arphia frigida, 293.
 " *pseudonietana*, 294.
Asemoplus montanus, 340.
Aspengopus viduatus, var. *unicolor*, 62.
Aulicus alboguttulatus, 246.
 " *basicollis*, 246.
 " *bilineatus*, 246.
 " *bitæniatus*, 246.
 " *coffini*, 246.
 " *monticola*, 246.
 " *Nero*, 246.
 " table of species, 245.
Aulicus thoracicus, 246.
Aulocara Elliottii, 276.
Autographa rubidus, 350.
 " *Sansoni*, n. sp., 349.
 Balanini, some new species, 114.
Balaninus acuminatus, 119.
 " *Algonquinus*, 118.
 " *appalachius*, 125.
 " *auctus*, 121.
 " *auriger*, 117.
 " *cuneatus*, n. sp., 115.
 " *cylindricollis*, n. sp., 115.
 " *haviolus*, n. sp., 114.
 " *lowensis*, n. sp., 122.
 " *macilentus*, n. sp., 120.
 " *mollis*, n. sp., 118.
 " *occidentis*, 127.
 " *ordinatus*, n. sp., 124.
 " *parvicollis*, n. sp., 125.
Balaninus perexiles, n. sp., 120.
 " *proprius*, n. sp., 121.
 " *rectus*, 116.
 " *setosicornis*, n. sp., 119.
 " *sparsellus*, n. subsp., 116.
 " *strigosus*, n. sp., 118.
 " *timidus*, n. sp., 121.
 " *tubulatus*, n. sp., 126.
 " *uniformis*, 127.
 " *Utensis*, n. sp., 126.
 " *Virginicus*, n. sp., 123.
 BALL, E. D., articles by, 266, 301.
 BANKS, NATHAN, articles by, 197, 284.
 BARNES, W., and McDUNNOUGH, J. B., articles by, 208, 246, 365, 409.
Basilona imperialis, 332.
 Bats, new dipterous parasite of, 59.
 Bees, from Steamboat Springs, Col., 310, 3.
 Bees, some new American, 169.
 BETHUNE-BAKER, G. I., article by, 96.
 BETHUNE, C. J. S., articles by, 1, 228, 379, 397.
Blattella germanica, 271.
 Book Notices—
 Catalogue N. A. Odonata, 283.
 " Nearctic Spiders, 284.
 Coleoptera of Indiana, 379.
 Experiments in the Generation of Insects, 151.
 Genera Insectorum, Cicindelinae, 65.
 General Biology (Needham's), 187.
 Our Insect Friends and Enemies, 31.
 The Genus *Dendroctonus*, 30.
 The House Fly, 379.

- Boopedum nubilum*, 276.
 BOWDITCH, F. C., article by, 53.
 BRADLEY, J. C., article by, 36.
Bradyaphis, 258.
Bradynotes expleta, 333.
 " *hispidus*, 333.
 Brodie, the late Dr. William, 47.
 BRUES, C. T., article by, 259.
 BUENO, J. R. DE LA T., articles by, 29,
 97, 176.
 BUENO, J. R. DE LA T., and ENGEL-
 HARDT, G. P., article by, 147.
 BURGESS, A. F., articles by, 94, 388.
 BUSCK, AUGUST, article by, 168.
 Butterflies from Kaslo and Northern
 B. C., 203.
 Butterfly collecting near Hope, B. C.,
 224.
 Butterfly Notes, 315.

Cænolyda Nortoni, n. sp., 91.
 CAESAR, L., article by, 31.
Calaphis, characters of, 255.
 Calgary, Bee Fauna of, 25.
Callicista Laceyi, n. sp., 365.
Callipterinae, second paper on genera
 of, 384.
Callipterini, table of genera and syn-
 onymical notes on, 253.
Callipteroides, characters of, 256.
Callipterus, characters of, 258.
Calpodes chemnis, 316.
 " *ethlius*, 316.
 " *obynthus*, 316.
Camnula pellucida, 294.
 CASEY, THOS. L., articles by, 105, 114.
Catocala Beutenmuelleri, n. sp., 251.
Catocala verrilliana, 251.
Catonia, List of N. American species,
 263.
Catonia nervata, n. sp., 265.
 " *rubella*, n. sp., 264.
Catonia, table of N. American species,
 261.
Cephaleia frontalis, 91.
 " *fulviceps*, n. sp., 90.
 " *Hopkinsi*, n. sp., 217.
Ceramidia Butleri, 60.
 " *caurensis*, 61.
 " *musicola*, n. sp., 60.
 " *viridis*, 61.
Ceroplastes Africanus, 76.
 " *Bergi*, 76.
 " *Bruneri*, 76.
 " *candela*, 79.
 " *ceriferus*, 76.
Ceroplastes denudatus, 75.
 " *egbarum*, 76.
 " *Lahillei*, n. sp., 74.
 " *Mexicanus*, 76.
Ceroplastidea, n. subg., 76.
Ceroplastina, n. subg., 76.
Ceuthophilus Agassizii, 355.
 " *aridus*, 354.
 " *Californianus*, 355.
 " *celatus*, 355.
 " *gracilipes*, 354.
 " *Henshawii*, 355.
 " *terrestris*, 354.
Chaitophorini, characters of, 385.
 " key to genera, 385.
 CHAMBERLIN, RALPH V., article by, 17.
Cheiloneurus lineascapus, n. sp., 207.
Chionobas gigas, 203, 228.
Chlœaltis abdominalis, 274.
 " *conspersa*, 274.
Chlorops nigripes, n. sp., 44.
 " *rufescens*, n. sp., 45.
 " *subnigra*, n. sp., 45.
Chortophaga viridifasciata, 294.
Chromaphis, characters of, 257.
Chrysophanus dorcas, 153.
 " *epixanthe*, 153.
 " *florus*, 154.
 " *helloides*, 153.
 " *mariposa*, 316.
Cicindela formosa Manitoba, 10.
 " *fulga*, 14.
 " *lepida*, 15.
 " *limbata*, 12.
 " *purpurea limbalis*, 14.
 " *pusilla*, 14.
 " *pusilla terricola*, 15.
 " *scutellaris LeContei*, 14.
 " *tranquebarica*, 13.
 " *venusta*, 12.
Cicindelidæ, habits of some Manitoba, 9.
Circotettix carlinianus, 300.
 " *lobatus*, 300.
 " *suffusus*, 300.
 " *undulatus*, 300.
 " *verruculatus*, 300.
Coccinellidæ, synonymical and other
 notes on, 109.
 COCKERELL, T. D. A., articles by, 25,
 59, 60, 64, 169, 171, 310, 366, 370,
 371.
 COCKLE, J. W., articles by, 95, 203.
Coleoptera from Plano, Texas, 229.
Coleoptera, synonymical and other
 notes on, 105.
Colias christina, 204.
 " *eriphyle*, 203.

- Colias Kootenai*, n. sp., 203.
 Conozoa Wallula, 298.
 COOLIDGE, KARL R., articles by, 315,
 374, 403.
 COQUILLETT, D. W. articles by, 41,
 375.
 Cordillacris cinerea, 273.
 Correction, a, 104.
 Correction in key to N. A. species of
Aeshna, 24.
 Corrections to paper on type species of
 N. Am. genera of Diptera, 375.
 COSENS, A., article by, 371.
 CRAWFORD, J. C., article by, 222.
 CRIDDLE, NORMAN, article by, 9.
 CROSBY, C. R., article by, 388.
Cryptocampus Bakeri, n. sp., 51.
 " *bebbianæ*, 52.
Culex? aureopunctis, n. sp., 195.
Cyaniris ladon, var. *Quesnellei*, 204.
Cyphoderris monstrosa, 354.
Cyrtusa blandissima, 7.
 " *superans*, n. sp., 7.
 Decennial Confession, a, 99.
 Delphax pictifrons, 65.
 Diapheromera femorata, 271.
 DIETZ, W. G., article by, 104.
Dioxys pomonæ, n. sp., 169.
 Diplotaxis, synonymical notes on, 110.
 Diptera from Wisconsin, 26.
 " new North American, 41.
 Dipterous parasite of bats, a new, 59.
Disogmus pubescens, habits of, 48.
 Dissosteira Carolina, 297.
 DOD, F. H. WOLLEY, articles by, 189,
 349.
Dolichopus dasypodus, 41.
 " *laciniatus*, 41.
 " *virga*, 41.
Drepanaphis, characters of, 255.
Drepanosiphum, characters of, 254.
 DYAR, H. G., article by, 399.
Eccoptyogaster piceæ, n. sp., 33.
 " *unispinosus*, 33.
Ecteccephala laticornis, n. sp., 46.
 " *sulcifrons*, n. sp., 46.
 Eleodes, synonymical notes on, 112.
 Elidiptera, list of N. American species,
 262.
 Emphytinæ, table of genera, 50.
Empria affinis, n. sp., 173.
 " *Arizonensis*, n. sp., 174.
 " *Caudelli*, n. sp., 173.
Empria distincta, n. sp., 173.
 " *melanostoma*, n. sp., 175.
 " *mellipes*, n. sp., 175.
 " *salicis*, n. sp., 174.
 " synonymy of, 173.
 " *submaculata*, n. sp., 174.
Encoptolophus parvus, 294.
 ENGELHARDT, G. P., and BUENO, J. R.
 DE LA T., article by, 147.
 Entomological collections in Quebec,
 228.
 Entomological collections of the late
 Dr. Fletcher, 76.
 Entomological Society of America, 36,
 388.
 Entomological Society of Ontario, 56.
 Entomological Society of Ontario, An-
 nual Meeting, 397.
 Entomology, International Congress of,
 291.
Eremnus Scudderi, 273.
Eucallipterus, characters of, 257.
Euceraphis, characters of, 255.
Euchætiæ castalla, n. sp., 210.
Euchætiæ castalla, ab. *griseopunctata*,
 210.
Euchætiæ gigantea, n. sp., 209.
Euchloe lanceolata, 315.
 " *australis*, 315.
Eucosma Scudderiana, 372.
Eudamus proteus, 316.
Eunotela angustiora, n. sp., 212.
Eupelmus brevicauda, n. sp., 205.
 " *mompheæ*, n. sp., 205.
Eupithecia bifasciata, 79.
 " *compactata*, n. sp., 58.
 " *fasciata*, n. sp., 79.
 " *fumata*, n. sp., 82.
 " *fumosa*, 82.
 " *Gibsonata*, n. sp., 78.
 " *grata*, n. sp., 78.
 " *indistincta*, n. sp., 82.
 " *Lagganata*, n. sp., 57.
Eupithecia, New Eastern American
 species, 77.
Eupithecia, New Western American
 species, 57.
Eupithecia Packardata, 83.
 " *Quebecata*, n. sp., 79.
 " *Spaldingi*, n. sp., 58.
 " *Winnata*, n. sp., 77.
 " *Youngata*, 77.
Eurostus validus, 62.
Euschistus fissilis, 167.
 " *latimarginatus*, n. sp., 167.
Euxoa Hollemani, 250.
 " *xasta*, n. sp., 249.

- Everes amyntula, 96.
 " comyntas, 96, 203.
 FALL, H. C., article by, 4.
 First International Congress of Entomology, 291.
 Fletcher Memorial Fountain, Unveiling of, 285.
 Fletcher Memorial Fund, 71.
 FORBES, W. T. M., article by, 364.
 FYLES, T. W., article by, 332.

 GAHAN, A. B., article by, 205.
 Galls, Lepidopterous, on Solidago, 371.
Gelichia inquilinella, n. sp., 168.
 Generic names in insects, Some pre-occupied, 8.
 Geometridæ, Hulst types of, 313.
 Geometridæ, New Southwestern genus and species of, 330.
 Geometridæ, stray notes on, 38.
 Geometrid Notes, 277.
 GIBSON, A., articles by, 69, 145.
Gloveria sphingiformis, n. sp., 252.
 Glyphina, characters of, 387.
Gnorimoschena asterella, 372.
 " *gallæsolidaginis*, 372.
Gomphocerus clavatus, 275.
Gonopsis pallescens, 62.
Græfia, n. g., 331.
 " *Smithii*, n. sp., 331.
 GRÆNICHER, S., article by, 26.
 Graptolitha, notes on certain species of, 381.
 Graphiphora, Prof Smith's treatment of, 399.
 Graphiphora, species of (see *Tæniocampa*).
Gryllus pennsylvanicus, 356.

Hadrotettix trifasciatus, 300.
 HADWEN, SEYMOUR, article by, 221.
Hæmaphysalis punctata, at Winnipeg, 221.
Halesidota indistincta, n. sp., 210.
Halictus vaporellus, n. sp., 366.
 " *Vierecki*, 158.
Hamaba, n. g., 131.
 " *Bahamensis*, n. sp., 131.
 " *dispersa*, n. sp., 131.
 Hemiptera from Steamboat Springs, Col., 370.
 Hemiptera, new and old, 62.
Heptagenia Californicus, 202.
Heptagenia frontalis, n. sp., 199.
 " *luridipennis*, 201.
 " *marginalis*, n. sp., 198.
 " *modestus*, 202.
 " *placita*, n. sp., 199.
 " *pleuralis*, 201.
Heptagenia, table of eastern species, 197.
Heptagenia tripunctata, n. sp., 199.
 HERRICK, G. W., article by, 373.
Heterocampa ditla, n. sp., 212.
Heterocampa pulverea, var. *averna*, n. var., 213.
 Heteroptera from Virginia and N. Carolina, 147.
 Heteroptera, some records of, 29.
 HEWITT, C. G., article by, 71.
Hippiscus latefasciatus, 297.
 " *neglectus*, 295.
 " *obscurus*, 296.
 " *tigrinus*, 296.
 " *tuberculatus*, 295.
 " *zapotecus*, 296.
Homalotylus albitarsus, n. sp., 206.
Hoplitella, n. gen., 169.
 " *pentamera*, n. sp., 170.
Hoplocampa brevis, 243.
Hoplocampa, characters of subgenera of, 243.
Hoplocampa, generic characters of, 242.
Hoplocampa lacteipennis, n. sp., 244.
 " *Oregonensis*, 243.
 " *Xanthura*, n. sp., 244.
Hoplogryon Bethunei, n. sp., 15.
 Hulstina Packardaria, 314.
 Hulst types of Geometridæ, 313.
Hydriomena autumnalis, var. *Crockeri*, n. var., 278.
Hydriomena autumnalis, var. *perfracta*, n. var., 279.
Hydriomena Californiata, 280.
Hydriomena furcata, var. *periclata*, n. var., 283.
Hydriomena furcata, var. *resecta*, n. var., 282.
Hydriomena irata, n. sp., 280.
 " new varieties of, 277.
Hydriomena nubilofasciata, var. *cumulata*, n. var., 281.
Hydriomena nubilofasciata, var. *cupidata*, n. var., 282.
Hydriomena nubilofasciata, var. *rapitata*, n. var., 281.
Hydriomena nubilofasciata, var. *vulnerata*, n. var., 282.
Hydriomena speciosata, var. *Agassizi*, n. var., 277.

- Hydriomena speciosata, var. *Taylori*, n. var., 277.
Hymenoptera, four new species of, 205.
Hymenoptera, parasitized by Strepsiptera, 325.
Hypochlora alba, 333.
- Iassus rama*, n. n., 63.
Idionotus brevipes, 354.
Insects from Steamboat Springs, Col., 310, 355.
Itycorsia brunnicans, 93.
" *Kincaidi*, n. sp., 91.
" luteopicta, 92.
" nivea, 92.
- James Fletcher Memorial Fund, 71.
Japanese Microlepidoptera, new species of, 346.
- KEARFOTT, W. D., article by, 346.
Kirkaldy, George Willis, 97.
KIRKALDY, G. W., articles by, 8, 62, 83.
- Labia minor, 271.
Lagoa crispata, ab. *grisea*, n. ab., 252.
" *Lacyi*, n. sp., 252.
Lepidoptera, new N. American, 208, 246.
Lepidopterous galls on Solidago, 37.
Leucopis bella, 239.
" bellula, 240.
" maculata, 241.
" nigricornis, 238.
" simplex, 239.
- Leucopis, table of American species, 238.
Life-histories of N. American Waterbugs, III, 176.
Lithophane hemina, 383.
Litodonta contrasta, n. sp., 211.
Lixus marginatus, notes on, 71.
Loceptes, n. gen., 130.
" recessus, n. sp., 130.
- Loderus niger, n. sp., 49.
LUDLOW, Miss C. S., article by, 193.
Lycosa nidifex, 17.
Lycosidæ, N. American, 17.
Lygæonematus Erichsonii in Minnesota, 93.
LYMAN, H. H., articles by, 2, 381.
Lynamorpha soror, 62.
- Lyttidæ, generic and subgeneric types of, 389.
- Macgillivrayella, table of species, 243.
MASON, F. R., article by, 22.
McDERMOTT, F. A., article by, 357.
McDUNNOUGH, J. B., and BARNES, W., articles by, 208, 246, 365, 400.
Mecostethus gracilis, 276.
" lineatus, 276.
Megymenum dentatum, 62.
Melanoplus affinis, 335.
" Alaskanus, 334.
" angustipennis, 338.
" atlanis, 335.
" bilituratus, 339.
" Bruneri, 334.
" Dawsoni, 336.
" devastator, 336.
" extremus, 338.
" fasciatus, 337.
" femur-rubrum, 338.
" fœdus, 339.
" Gladstoni, 340.
" infantilis, 339.
" Kennicottii, 334.
" minor, 339.
" monticola, 338.
" Packardii, 339.
" validus, 337.
" Washingtonianus, 337.
- Melanoxantherium, characters of, 384.
Melitæa alma, and synonymy, 403.
Meraporus bruchivorus, 344.
" calandræ, 344.
" dubius, 344.
" requisitus, n. sp., 344.
" utilis, n. sp., 341.
" Vandinei, n. sp., 343.
- Mesoleuca boreata, n. sp., 87.
" Casloata, n. sp., 88.
" decorata, n. sp., 87.
" ethela, 85.
" formosa, 85.
" hersiliata, 85.
- Mesoleuca implicata, var. *Williamsi*, n. var., 68.
Mesoleuca mutata, n. var., 87.
" occidentata, 86.
- Metacosmus mancipennis, n. sp., 41.
Metator pardalinum, 298.
Miarus consuetus, n. sp., 143.
" erebus, n. sp., 143.
" hispidulus, 143.
" Illini, n. sp., 144.
" nanus, n. sp., 144.

- Miarus puritanus*, n. sp., 144.
 " table of American species, 142.
Microlepidoptera, new species of Japanese, 346.
Microvelia Americana, life history of, 176.
Microvelia pygmæa, 178.
Microtychius, n. subgen., 136.
 " table of species, 136.
Monaphis, characters of, 258.
Monellia, characters of, 259.
Mosquito Observations, 193.
Myrmecophila Oregonensis, 355.
Myzocallis, characters of, 256.

Nasomia tortricis, n. sp., 259.
Neduba carinata, 353.
Nemobius fasciatus abortivus, 355.
 " *maculatus*, 356.
 NEWCOMB, W.W., article by, 153.
Nomada fontis, n. sp., 367.
Nomenclature, Rules of, adopted by International Congress, 291.
North American Diptera, new, 41.
North American Lycosidæ, notes on, 17.
Notonecta undulata, preying on eggs of *Belostoma*, 340.

Obituary Notices—
 George Willis Kirkaldy, 97.
 Rev. Jeremiah Lott Zabriskie, 168.
Oculiomyia Fulleri, 193.
Oecanthus nigricornis quadripunctatus, 356.
Oncideres cingulata, 234.
Orchelimum Manitobense, n. sp., 351.
 " *vulgare*, 351.
Orthoptera of Western Canada, 269, 293, 333, 351.
Osmia Amala, n. sp., 312.
 " *andrenoides*, 170.
 " *eutrichosa*, n. sp., 312.
 " *Georgica*, 171.
 " *globosiformis*, n. sp., 311.
 " *Louisiana*, n. sp., 171.
 " *permorata*, n. sp., 310.
 " *physaria*, 171.
 " *pseudamala*, n. sp., 312.
 " *remotula*, n. sp., 170.
 " *semirubra*, 170.

Pachybrachys Carolinensis, n. sp., 55.
 " Further notes on, 53.
 " *notatus*, n. sp., 53.

Pachybrachys Shasta, n. sp., 56.
 " *trivittata*, n. sp., 54.
Pamphiliinæ, generic synopsis of, 216.
Pamphilius fulvifrons, n. sp., 218.
 " *ocellatus*, n. sp., 218.
 " *rubi*, n. sp., 219.
 " *subcavifrons*, n. sp., 219.
Panaphis, 258.
Parallelomma flavovaria, 44.
 " *setipes*, n. sp., 44.
Parasites of genus *Meraporus*, new, 341.
Parasitic Hymenoptera, new African, 222.
Paratoxonus lenis, 51.
Paratychius, n. subg., 135.
Pardosa solivaga, 17.
 PEARSELL, R. F., articles by, 213, 313, 330.
Pemphigus, note on Mr. Jackson's Synopsis, 83.
Pentatomidæ, two new Nebraska species of, 166.
Perania, n. gen., 249.
 " *dissociata*, n. sp., 249.
Perdita citrinella, n. sp., 103.
 " *maculipennis*, n. sp., 102.
 " *pallidipennis*, n. sp., 101.
Phlibostroma quadrimaculatum, 273.
Phoetaliotes Nebrascensis, 340.
Photinus consanguineus, 360.
 " *pyralis*, light emission of, 357.
 " *scintillans*, 360.
Photuris Pennsylvanica, light emission of, 358.
Phthiria Aldrichi, 27.
Phymatosiphum, 255.
Piazorrhinus pictus, 128.
 " *thoracicus*, 128.
Pirata procursus, 17.
Plagodis Keutzingaria, 38.
Plateros coccincolis, 371.
Platybothrus brunneus, 275.
Plethochaeta atrifrons, n. sp., 44.
Pleroneura brunneicornis, n. sp., 89, 220.
 " *fulvicornis*, n. sp., 89.
 " *Kæbeleï*, n. sp., 90.
 " *lutea*, n. sp., 90.
 " *Schwarzi*, n. sp., 220.
Pleroneura, table of N. American species, 88.
Podisma nuda, 333.
 " *Oregonensis*, 334.
Popea lutea, 193.
Proarchus, n. n., 100.
Proctotrypid in family *Scelioninæ*, a new, 15.

- Prothrinax ocellata*, n. sp., 246.
Prototaxonus, n. gen., 49.
 " *typicus*, n. sp., 50.
Provia, n. gen., 248.
 " *argentata*, n. sp., 248.
Pterocallis, 256.
Pterocomma, characters of, 384.
Pterocommini, table of genera, 384.
Pteromalid parasitic on *Tortrix fumerana*, a new, 259.
Ptinidæ, synonymical notes on, 111.
Ptochoryctes; characters of, 347.
 " *tsungensis*, n. sp., 347.
 " " larva of, 364.
Ptychodes, 258.
Pygarcia roseicapitis, 210.
Pyrophæna granditarsus, 29.
 " *rosarum*, 28.
- Rhagoletis fausta*, 99.
 " *grindeliæ*, 99.
 " *suavis*, 99.
 ROBERTSON, CHARLES, article by, 323.
 ROHWER, S. A., articles by, 49, 88, 172, 215, 242.
 RUGGLES, A. G., article by, 93.
 RUSSELL, J. H., article by, 224.
- Sagrina vittata*, 62.
 SANDERS, G. E., article by, 15, 48.
Scelio Howardi, n. sp., 222.
Scolytidæ, notes on, 161.
Scudderia curvicauda, 351.
 " *pistillata*, 351.
Scydmenidæ, synonymical notes on, 109.
Scymnus Loewii, 232.
Selidosema lachrymosum, 314.
 " *homopteroides*, 314.
 SEVERIN, H. C., and H. P., article by, 340.
Silphidæ, new, of the tribe *Anisotomini*, 4.
Sipha, characters of, 386.
 SMITH, J. B., article by, 317.
Spharagemon æquale, 297.
 " *Bolli*, 298.
 " *collare*, 297.
Sphecodes Davisii, 159.
 " *nitidissimus*, n. sp., 367.
Stannodes delicatum, 214.
 " *Reckseckeri*, n. sp., 213.
Staphylinidæ, synonymical notes on, 105.
Steamboat Springs, Insects from, 310, 366.
- Stegomyia nigrizia*, 194.
Steirosys borealis, 354.
Stenobothrus acutus, 275.
 " *curtipennis*, 274.
Stenopelmatus californicus, 354.
 " *longispina*, 354.
Stetholiodes, n. gen., 4.
 " *laticollis*, n. sp., 4.
Stibadion mavina, n. sp., 250.
Stirapleura decussata, 276.
Strepsiptera, Hosts of, 323.
Strongylogaster tibialis, 51.
Subcallipterus, 256.
 SWAINE, J. M., articles by, 30, 33.
 SWETT, L. W., articles by, 68, 277.
Symdobius, characters of, 386.
Syntomid moths with bananas, 60, 95.
- Tæniocampa alia*, 323.
 " *alurina*, 192.
 " *Brucei*, 323, 400.
 " *confluens*, 323, 400.
 " *hibisci*, 192, 323, 400.
 " *inflata*, 323, 400.
 " *inherita*, 323, 400.
 " *instabilis*, 323, 400.
 " *latirena*, 192, 323, 400.
 " *malora*, 323, 400.
 " *mecrona*, 192.
 " notes on species of, 317.
 " *nubilata*, 323, 400.
 " *pacifica*, 192, 323, 400.
 " *præses*, 193.
 " *proba*, 323, 400.
 " *quinquefasciata*, 323, 400.
 " *saleppa*, 193.
- Tamolia ramifera*, 62.
Targionia celtis, n. sp., 373.
 TAYLOR, G. E., articles by, 35, 57, 85.
Tenebrionidæ, synonymical notes on, 110.
Tenthredinoidea, new species from California, 49.
Tenthredinoidea, notes on and descriptions of new species, 49, 88, 172, 215, 242.
Tetrigonia, validity of, 63.
Tetrastichus periplanetae, n. sp., 223.
Tetrix acadicus, 272.
 " *Brunneri*, 272.
 " *crassus*, 272.
 " *granulatus*, 271.
 " *Hancocki*, 272.
 " *ornatus*, 272.
Thamnotettix atridorsum, var. *vesca*, n. var., 302.

- Thamnotettix atridorsum*, var. *vetula*,
 n. var., 302.
Thamnotettix dissociata, n. sp., 306.
 " *gemella*, n. sp., 303.
 " *generosa*, n. sp., 304.
 " *gerula*, n. sp., 304.
 " *gladiola*, n. sp., 309.
 " *gloriosa*, n. sp., 308.
 " *gutturosa*, n. sp., 307.
 " new Western, 266.
 " *Titusi*, n. sp., 267.
Thamnotettix Titusi, n. sp., var.
vivata, n. var., 302.
Thamnotettix umbratica, n. sp., 309.
 " *ursina*, n. sp., 307.
 " *vapida*, n. sp., 305.
 " *vastula*, n. sp., 268.
 " *venditaria*, n. sp., 266.
 " *vespertina*, n. sp., 301.
 " *viriosa*, n. sp., 266.
 " *visalia*, n. sp., 301.
Tephroclystis acutipennis, 314.
 " *flexibilis*, 313.
 " *niveifascia*, 313.
 " *perfusca*, 314.
 " *plenoscripta*, 313.
 " *plumbaria*, 313.
Thecla iroides, var. *immaculata*, n.
 var., 204.
Thecla, new Texan, 365.
 " notes on, 374.
Therioaphis, 256.
Thomasia, n. gen., 386.
 THOMPSON, W. R., article by, 238.
Thymelicus garita, notes on larva of,
 145.
Thysanocnemis brevis, n. sp., 129.
 " *helvola*, 130.
 " *horridula*, 129.
 " *ocularis*, n. sp., 129.
 " *punctata*, n. sp., 129.
Trachyrhachis Kiowa, 298.
Trichobius corynorhini, n. sp., 59.
 " major, 59.
Trimerotropis agrestis, 298.
 " *Bruneri*, 299.
 " *cæruleipes*, 298.
 " *citrina*, 298.
 " *latifasciata*, 299.
 " *longicornis*, 299.
 " *monticola*, 299.
 " *sordida*, 299.
 " *vinculata*, 299.
 " " *similis*, 299.
Tuberculatus, 256.
 TUCKER, E. S., articles by, 229, 341.
Tychius atomus, n. sp., 137.
Tychius Californian species of, 132.
 " *Carolineæ*, n. sp., 134.
 " *curtipennis*, n. sp., 141.
 " *dilectus*, n. sp., 133.
 " *dulcis*, n. sp., 140.
 " *echinus*, n. sp., 138.
 " *errans*, n. sp., 142.
 " *erraticus*, n. sp., 136.
 " *fatuus*, n. sp., 139.
 " *fraterculus*, n. sp., 139.
 " *grypus*, n. sp., 139.
 " *hesperis*, n. sp., 133.
 " *hystrix*, n. sp., 138.
 " *imbellis*, n. sp., 140.
 " *imbricatus*, n. sp., 135.
 " *languidus*, n. sp., 135.
 " *lineellus*, 132.
 " *nimius*, n. sp., 134.
 " *porcatus*, n. sp., 141.
 " *probus*, n. sp., 134.
 " *puellus*, n. sp., 137.
 " *radians*, n. sp., 133.
 " *setosus*, 138.
 " *tacitus*, n. sp., 132.
 " *texanus*, n. sp., 134.
 " *vernilis*, n. sp., 138.
Udeopsylla nigra, 355.
 " *robusta*, 355.
Vacuna, characters of, 388.
Vacunini, characters of, 387.
 " table of genera, 387.
 VAN DUZEE, E. P., article by, 261.
 VENABLES, E. P., article by, 228.
 WALKER, E. M., articles by, 24, 151,
 187, 269, 283, 293, 333, 351, 380.
Water-bugs, life-histories of North
 American, 176.
Wax-scale, new Argentine species, 74.
 WELLMAN, C., article by, 389.
 WICKHAM, H. F., article by, 65.
 WILSON, H. F., articles by, 253, 384.
 WINN, A. F., article by, 350.
Wisconsin Bees, new and little known
 species, 101, 157.
Wisconsin, new and rare Diptera from,
 26.
 WOLCOTT, A. B., article by, 245.
Xiphidion brevipenne, 353.
 " *fasciatum*, 352.

-
- | | |
|--|--|
| Xiphidion saltans, 353. | Xylina disposita, 191. |
| Xyleborus dispar, 161, 164, 165. | " Grotei, 190. |
| " obesus, 162. | " hemina, 190. |
| Xyleborus " var. <i>minor</i> , n. var., | " laticinera, 190. |
| 164, 165. | " Winnipeg, 190. |
| Xyleborus pyri, 161. | |
| Xyleborus serratus, n. sp., 162, 165. | |
| " tachygraphus, 161, 165. | YOTHERS, M. A., article by, 69. |
| Xylina animada, 190. | |
| " antennata, 190. | |
| " cinerea, 190. | ZIMMER, J. T., article by, 166. |
| " cinerosa, 190. | <i>Zodion lativentre</i> , n. sp., 26. |

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